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RESIDENTIAL WOOD SMOKE REDUCTION PLAN FOR LIBBY, MONTANA

Submitted by:
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and

BOARD OF COUNTY COMMISSIONERS
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June, 1991

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LIST OF ABBREVIATIONS

APCD	Libby Air Pollution Control District
CDBG	Community Development Block Grant
DEIS	Noranda Draft Environmental Impact Statement
DHES	Montana Department of Health and Environmental Sciences
DNRC	Montana Department of Natural Resources and Conservation
DWR	Idaho Department of Water Resources
EPA	U.S. Environmental Protection Agency
LCDEH	Lincoln County Department of Environmental Health
LIEAP	Low Income Energy Assistance Program
PM10	Inhalable particulates; particulate matter less than 10 microns in diameter
PP&L	Pacific Power and Light Company
PRC	PRC Environmental Management, Inc.
SIP	State Implementation Plan
USFS	U.S. Forest Service
WHA	Wood Heating Alliance

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CHAPTER I:

BACKGROUND

SECTION 1: INTRODUCTION

This report contains the Residential Wood Smoke Reduction Plan for Libby, Montana. It was prepared by PRC Environmental Management, Inc. (PRC), in Denver, Colorado, under the direction of the Lincoln County (Montana) Department of Environmental Health (LCDEH). This report provides strategies for reducing residential wood smoke pollution and provides information on how to implement the strategies. In addition, it contains background information so that the reader can understand the problem and how the recommended air pollution control strategies were developed.

The report contains two chapters. Chapter I: Background describes the residential wood smoke problem and why this plan was prepared. It contains a description of the air pollution problem in Libby and the contribution of residential wood smoke to that problem. It also discusses relevant regulations and why something should be done to reduce residential wood smoke in the area. Chapter I provides a profile of the community and discusses the importance of wood burning as a heat source to the residents of Libby.

At the end of Chapter I there is a description of how the Residential Wood Smoke Reduction Plan was prepared, including who participated in the analysis and what alternatives were investigated.

Chapter II: The Plan presents the Residential Wood Smoke Reduction Plan. It contains several specific strategies to reduce residential wood smoke air pollution in Libby. Some strategies involve changes that individual residents can make while continuing to burn wood, such as improving home weatherization and adopting new wood burning habits. Other alternatives involve using another fuel instead of wood. In addition, the plan includes strategies for replacing existing wood stoves with new, lower polluting wood stoves.

The plan describes several ways to pay for each strategy. Some strategies can be implemented at little or no cost; others at reduced costs with the participation of local businesses and financial institutions. The plan describes ways in which the community, businesses, educators, and government officials can help to implement the strategies. A timetable for the Residential Wood Smoke Reduction Plan activities is provided, including government actions and community involvement.

While the report contains a plan to reduce residential wood smoke in Libby, the decision to actually implement any or all of the recommended strategies is the responsibility of the residents of Libby, local businesses, and government officials.

This report does not contain rules or regulations requiring changes by individuals, businesses, or government agencies.

This plan does not contain information or recommendations to reduce emissions from other sources of air pollution, such as road dust, slash burning, or industrial sources. Lincoln County is addressing those sources of air pollution.

There are several recommended strategies in this plan. Each strategy will help to reduce wood smoke pollution. Implementation of as many of the strategies as possible is recommended to achieve the most air quality benefits.

SECTION 2: WHY WAS THIS PLAN PREPARED?

Air pollution is a serious problem in and around Libby, Montana. Situated in the Kootenai River Valley, this area forms a natural sink for air that deters atmospheric mixing. As with similar locales around the country, air pollution stagnates and worsens in the winter when cold, dense air settles in the valley.

The air pollution in Libby is comprised of several ingredients, from harmful gases to small particles. The Libby area frequently violates the National Ambient Air Quality Standards for small airborne particles with an aerodynamic diameter of 10 microns or less, referred to as PM10. A diameter of 10 microns is equal to approximately one-tenth the thickness of a human hair. This fraction of airborne particulate matter, also referred to as inhalable or respirable particles, is the size range which is most likely to penetrate to the deepest parts of the lung. Larger particles are typically filtered out by the human respiratory system.

Elevated PM10 concentrations are found in Libby's air between September and May, with the highest levels between December and April. Several sources contribute to Libby's PM10 problem. These include residential wood smoke, road dust, and, to some degree, slash burning and industry. Slash burning is the practice of burning logging wastes remaining in forest areas that have been harvested. Although residential wood burning is not always the primary contributor to air pollution from September through May, it is a major cause of high PM10 concentrations.

Figure 1 on Page I-28 illustrates the PM10 problem in Libby. It shows the daily PM10 concentrations for January, March, and October of 1990. During January and March, the concentrations were high and exceeded the National Ambient Air Quality Standard for PM10 which is 150 micrograms per cubic meter. These are also 2 months where residential wood smoke contributes greatly to the overall PM10 concentrations. During the month of October, when PM10 values are lower, residential wood smoke is not a major contributor to Libby's air pollution problem. PM10 values in general are not exceptionally high during periods of slash burning such as in October. Slash burning, while a nuisance, does not appear to be a significant contributor to Libby's PM10 pollution problem. The two major culprits are road dust and residential wood burning. Road dust is being addressed separately by the county and is not the focus of this project. Residential wood burning is a significant source of Libby's PM10 concentration and the overall air pollution problem.

Lincoln County commissioned this plan as part of the continuing effort to reduce wood smoke emissions in Libby. This project is meant to help reduce wood smoke emissions and help the

households in the Libby Air Pollution Control District (APCD) adjust to recently developed local air quality regulations. Improving the health and safety of local residents, developing the economy, improving visibility, and complying with federal air quality standards are also primary motivations to reduce residential wood smoke pollution.

Health and Safety Concerns of Residential Wood Heating

In recent years, scientific studies have demonstrated that wood smoke is a serious health hazard, both as indoor and outdoor pollution. These hazards are reported by the U.S. Environmental Protection Agency (EPA) in the Guidance Document for Residential Wood Combustion Emission Control Measures (EPA-450/2-89-015, September 1989). A team of researchers, health professionals, and government regulators from the University of Washington, Washington Department of Ecology, and the Puget Sound Air Pollution Control Agency have thoroughly examined the health effects of wood smoke ("Wood Smoke: Health Effects and Legislation, " The Northwest Environmental Journal). They found several substances in wood smoke, including carbon monoxide, aldehydes, nitrogen dioxide, polycyclic organic materials, and PM10. These pollutants can have both chronic (continuing) and acute (short-term) health effects and are associated with a host of harmful effects including:

- Decreased lung capacity
- Increased incidence of angina among people with cardiac disease
- Accumulated fluid in the lungs (edema) and scarred lungs (fibrotic changes)
- Increased cancer risks

The potential effects are serious enough to warrant the EPA to publish a summary of these effects in the EPA Fact Sheet On Health Effects From Residential Wood Combustion Emissions, provided in Appendix B of this report.

Another study conducted in Juneau, Alaska identified certain harmful compounds from wood smoke ("Wood Smoke Impacted Air: Mutagenicity and Chemical Analysis of Ambient Air in a Residential Area of Juneau, Alaska," Journal of Air Pollution Control Association, Volume 38, pages 652-660, May 1988).

Locally, there are indications of the negative health effects. Several Libby area health professionals stated there is evidence to indicate a correlation between wood smoke and negative health effects, such as an inordinate amount of inner ear infections and serious aggravation of

existing lung problems during high pollution periods.

In addition to health effects, there has been a concern for safety with the use of wood burning devices. In recent years, there have been several fires associated with wood burning devices in the Libby area. Discussions with the Libby Fire Marshall indicated that approximately one-fourth of the fires in the last 5 years were related to wood burning devices. This is not to suggest that wood stoves automatically cause fires. However, Libby area fire officials indicate that inadequate maintenance and control of wood burning devices, conditions which contribute to increased air pollution, may be problems which exist in the Libby area.

Federal and State Regulations

In 1987, EPA designated Libby as a Group I Area for PM10 because it has a greater than 95 percent probability of exceeding federal PM10 standards. Since then, Libby has violated the federal standards several times.

EPA established ambient air quality standards for PM10 in July 1987. They are:

- 50 micrograms per cubic meter on an annual average
- 150 micrograms per cubic meter on a 24-hour average

These standards are established to protect public health and the environment. If the 24-hour average is exceeded more than once a year in an area or if the annual average is exceeded, the area is classified as "nonattainment." Libby is now classified as nonattainment.

Once an area is classified as nonattainment, an implementation plan must be developed to reduce pollution to bring the area into compliance with federal standards. Stricter permitting rules are in effect in a nonattainment area. If an area does not achieve improved air quality and adhere to the terms of the implementation plan, the EPA can impose legal and economic sanctions.

The Libby area exceeded both the 24-hour and the annual PM10 standard every year since monitoring began in 1987. The maximum 24-hour concentrations of PM10 have been as high as 170 percent of the standard. The 24-hour standard was exceeded six times in 1987, 13 times in 1988, and seven times in 1989.

EPA requires that the state of Montana develop a plan for implementation, maintenance, and enforcement of the federal ambient air standards, including PM10. The Montana Department of

Health and Environmental Sciences (DHES) is responsible for developing and implementing the State Implementation Plan (SIP) to bring Libby into compliance with the federal PM10 standards.

Local Air Pollution Control Program

According to officials of the state of Montana, prior to a bill passed in 1991 by the Montana Legislature, a municipality or county could form a local air pollution control program only if petitioned by 15 percent of the qualified electors in this jurisdiction. The legislature has changed this petition requirements and now a local program can be established after public hearing by a municipality or county. This local program must include air quality regulations compatible with, more extensive than, or more stringent than Montana state regulations; enforcement capabilities by administrative and/or judicial processes; and an administrative organization with staff and financial resources to effectively carry out the program. A local program is eligible for state financial aid in an amount up to 30 percent of the local program's budget. Federal financial aid that is subsequently granted to a local program is not considered state aid. The Lincoln County Commissioners and Libby City Council plan to establish a local air pollution control program. The program will be adopted for all of Lincoln County and the City of Libby.

The nonattainment area, that area which violated federal air quality standards, will make up the APCD. The APCD will include the City of Libby and only that portion of the county that contributes to the air pollution problem. The APCD boundaries were determined by ambient air monitoring data, population and terrain, and encompass most of the populated area around Libby. These boundaries assure that all the emissions contributing to noncompliance are covered by the control strategies developed for the SIP. See Figure 2 on page 1-29 for the APCD boundaries.

Regulations have already been adopted by the city and county to address road dust, residential wood burning, and prescribed slash burning in the APCD. These regulations will need to be readopted. These regulations will only apply to the APCD, as is currently the case.

The current residential wood burning regulations provide for a voluntary curtailment program. Under this program, emissions from all solid fuel burning devices are limited, and only solid fuel burning devices such as a sole source of heat or having a Class I permit can burn on alert days. Class I permits are issued for solid fuel burning devices if the emissions do not exceed 4.1 grams per hour weighted average when tested using EPA testing methods.

If a 60 percent reduction in all APCD emissions cannot be demonstrated after implementation of the voluntary wood smoke curtailment program, a mandatory wood smoke curtailment program

may be initiated. Under the mandatory curtailment program, no sole source of heat permits will be issued. However, solid fuel burning burning devices with a Class I permit will be allowed to burn on alert days. Fines will be imposed for noncompliance.

Sources of Residential Wood Smoke

In addressing PM10 emissions from residential wood burning devices, it is important to identify the specific wood smoke sources. There are approximately 2,200 to 2,300 wood burning devices in Libby, as estimated by a local wood stove professional who sells and installs wood stoves. The term wood burning device encompasses a wide range of categories. This plan is concerned with the types of wood burning devices found in the Libby APCD. While heating is the primary function for the vast majority of wood burning devices, some are designed for cooking or aesthetic purposes.

Wood burning devices have different particulate emission rates and heating efficiencies. The emission rate relates directly to the particulates a stove is releases. Heating efficiency is a measure of how effectively a wood burning device converts wood to heat.

Each type of wood burning device produces its own degree of pollution. Some are cleaner and more efficient by design. Wood burning devices manufactured in the last few years produce up to 90 percent less emissions than older devices, due to advanced technology and EPA certification requirements. Older stoves generally produce large amounts of pollution in relation to the amount of heat they produce.

Heating efficiency is a two-stage unit of measurement combining combustion efficiency and heat transfer efficiency. Combustion efficiency is the measure of the wood burning device's ability to produce the maximum amount of heat inside the stove by completely burning the fuel. Heat transfer efficiency is the ability of the wood burning device to transport heat into the residence rather than up the flue. This helps to determine the total operating cost of the wood burning device to the owner. These concepts are presented in the document Wood Heat, published by the Montana Department of Natural Resources and Conservation (DNRC), March, 1986.

Table 1 on page I-8 presents the types of wood burning devices in the Libby APCD. The table shows their heating efficiency and total particulate emission rates, which include PM10 particles as well as particles larger than 10 microns in diameter. However, as stated throughout this report, it is PM10 emissions that are of concern.

This section describes the pollution properties and heating efficiency of the wood burning devices listed in Table 1. When discussing emission rates for the wood burning devices, reference is made to Class I and Class II devices. These classes refer to permit classes for wood burning devices defined by Lincoln County air pollution control regulations. The regulations define the classes as follows:

CLASS I: Wood burning devices emitting less than 4.1 grams of particulates per hour. (Stove can be burned on alert days announced by the county.)

CLASS II: Wood burning devices emitting less than 7.5 grams of particulates per hour. (Stove cannot be burned on alert days announced by the county.)

While general references are made to Class I and Class II devices throughout this report, readers should refer to a copy of the county regulations for specific information about permit guidelines and requirements.

TABLE 1

WOOD HEATING DEVICES IN LIBBY

Type of Wood Burning Device	Number in Libby[1]	Heating Efficiency[2]	Average Particulate Emissions (grams/hour)[2]
Fireplaces	Very few in use	0 - 15%	40 to 60
Fireplace inserts (EPA certified and noncertified)	300	Up to 50 or 60%	5 to 50 (depends on whether they are certified or non-certified)
Noncertified wood burning stoves	1,500	Up to 50%	Up to 50
EPA-certified wood burning stoves (both catalytic and noncatalytic)	125	50 to 80%	1 to 6
Pellet stoves	150	60 to 85%	1 to 2
Wood furnaces	100	Up to 85%	Varies greatly
Other miscellaneous wood burning devices	Fewer than 50	Varies greatly	Varies greatly
Total Estimated Wood Burning Devices		**2,200 to 2,300**	

Source:
[1] PRC interviews with Libby wood heating professionals
[2] Wood Heat, Montana Department of Natural Resources and Conservation, March 1986.

The types of wood burning devices found in Libby are described below.

Fireplaces - Fireplaces comprise less than 2 percent of the total number of wood burning devices in the Libby APCD. They are inefficient sources of heat. In some cases, fireplace use creates a net loss of heat. The heat transferred up the flue may be greater than that generated by the fire if heat from inside the home is drawn up the chimney. Fireplaces are high polluters, emitting 40 to 60 grams of particulates per hour.

Fireplace Inserts - Fireplace inserts convert a conventional fireplace into a more efficient heat source. Their heating properties are similar to wood burning stoves. These inserts can be divided into two types. There are the new, low pollution inserts which are permitted by the local APCD as a Class I or Class II wood heating device. There are also older inserts whose emissions are too high to be permitted by the APCD. With a new, low polluting fireplace insert, a fireplace can be efficient as a home heating unit and meet county permit requirements.

Wood Stoves That Do Not Meet County Permit Requirements - Many of the older wood stoves in Libby emit extremely high levels of particulates, up to 50 grams an hour. As Table 1 indicates, approximately 50 percent of the wood burning devices in Libby fall into this category. These devices are the largest contributors to residential wood smoke in Libby. Heating efficiency varies among these devices.

Wood Stoves That Meet County Permit Requirements - These are new, low polluting wood stoves which generally have a high heating efficiency if used properly. Only stoves that emit less than 7.5 grams of particulates per hour can qualify for permits. They may or may not have a catalytic converter. Catalytic converters reduce nitrogen oxide and carbon monoxide emissions by channeling flue gases through a catalytic bed. This bed typically consists of a honeycomb of rhodium or platinum which reduces nitric oxide, and oxidizes the carbon monoxide. Catalytic converter stoves require a great deal of maintenance. The converter needs to be replaced every 1 to 3 years. Whether a wood stove qualifies for a Class I or a Class II permit depends on the stove emission rate, as reported by the manufacturer and determined by EPA testing procedures.

Pellet Stoves - Pellet stoves are very low polluters, generally emitting less than 5 grams of particulates per hour. Instead of burning wood, these stoves burn pellets comprised of wood wastes that are dried and pressed into small pellets. Due to their significant design and operational differences, pellet stoves are usually categorized separately from traditional wood burning stoves.

Wood Furnaces - The pollution emission rates of wood furnaces vary greatly depending on

many factors such as type, age, and upkeep. It is difficult to measure the pollution emission rates of wood burning furnaces. Class I and Class II permits do not apply to this device. In fact, in the regulated control area, an existing wood furnace cannot be replaced with a new wood furnace. An alternative heating device would need to be used, such as a propane furnace or electric baseboard heater.

Other Miscellaneous Wood Burning Devices - This category includes the remaining types of wood burning devices, few of which are located in Libby. Pollution rates and heating efficiency of the devices vary. They are:

- Pellet add-on to an existing stove
- Catalytic converter add-on
- Cooking wood burning stoves

SECTION 3: PROGRAM GOALS

Regulatory Goals

The community's regulatory goal is to reduce ambient airborne particles from residential wood burning which contribute to local violations of the federal air pollution standards. A total reduction of approximately 60 percent of PM10 levels is necessary for compliance with federal standards. The reduced levels and compliance with federal standards must be maintained even if the number of sources increase because population or industrial activities increase.

The Lincoln County Board of Commissioners have passed an emergency resolution to control sources of particulate air pollution in the Kootenai Valley, as required by EPA and the state of Montana. The Libby City Council passed a similar ordinance. The content of the resolutions was developed by the Libby Air Quality Committee, a local volunteer committee convened by DHES to develop an air pollution control program for the area. The resolutions comprise a comprehensive program for achieving federal air quality standards for PM10 levels.

Compliance with wood burning ordinances during the first 2 years (November 1990 through October 1992) of the program is voluntary. Mandatory restrictions on wood burning may go into effect in October 1992 if the federal air quality standards are not achieved through reductions in emissions from all sources in the APCD.

Ultimately, the federal government can impose sanctions on Montana if areas such as Libby do not achieve compliance with federal air standards. The federal government can withhold federal highway and air grant funds to the state, prohibit some forms of industrial growth in the Libby area, and withhold permits for new industrial activities. The new 1990 Amendments to the Clean Air Act give EPA greater authority to enforce air quality standards.

Community Welfare and Economic Growth

Compliance with government regulations and avoidance of government sanctions are not the only community goals. The primary concerns of local officials and residents are the health and welfare of the community and its residents, and economic growth.

The smoke from residential wood burning is detrimental to the health of all local residents, particularly children, senior citizens, and individuals with other health problems. Reduction of emissions from wood burning will contribute to improved public health.

Wood smoke emissions are also major contributors to visibility impairment. For the same quantity of airborne particles, emissions from wood burning are 3 to 10 times more effective at reducing visibility than emissions of road dust or fly ash. This is due to the typical size of wood smoke particles. They are in the size range that is most effective at scattering light. In addition, the composition and color of wood smoke particles are most effective at absorbing light.

Thus, the visible air quality in Libby can be improved significantly by reductions in wood smoke emissions. This visible improvement will contribute to an improved environment, which in turn can contribute to increased attractiveness of and tourism in the Kootenai Valley.

Reduction in visible air pollution can enhance area tourism and economic development. Decreasing air pollution will help to persuade new industry to locate in the area.

SECTION 4: COMMUNITY PROFILE

Libby is the Lincoln County seat and is located in the Kootenai Valley in northwestern Montana. Libby's climate, which is described as modified pacific maritime (Libby Area Economic Profile, 1988), along with its location in a deep mountain valley, result in poor dispersion of air pollutants.

Residents of Libby and the surrounding area rely heavily on wood heat (DNRC, 1990). To decrease residential wood smoke's contribution to the air pollution in Libby, Libby residents must modify their heating habits. To better understand the heating changes that would best suit Libby, a review of Libby's socioeconomic situation, including employment, level of income, housing, and recreational facilities, was completed. The following sections discuss these issues as well as Libby's current energy usage and other local concerns.

Socioeconomics

Relevant reports and publications were reviewed to identify Libby's current socioeconomic status. Community members were interviewed to further clarify the area's level of employment, population, income, housing, and recreational facilities.

Employment - The Lincoln County and Libby economies are based on natural resources. The major industries in the Libby area are as follows: (1) timber harvesting and manufacturing; (2) federal and local government (such as the U.S. Forest Service (USFS) and the local school district); (3) mining; and (4) other miscellaneous industries such as services and transportation (the major transportation employer is Burlington Northern and the major services employer is St. John's Lutheran Hospital), communications (such as General Telephone Company), and public utilities (such as Pacific Power and Light (PP&L)) (Noranda Draft Environmental Impact Statement (DEIS), 1990). Tourism-related employment is included in these categories. It should be noted that the Noranda Montanore mine may be developed in April 1992 approximately 20 miles outside of Libby. Noranda Minerals Corporation (Noranda) stated that the company anticipates requiring a workforce of 450 employees for the mine. Eighty percent of these people, according to Noranda, will be hired locally.

The major wood products employer in the county is Champion International Corporation (Champion) in Libby. Champion has employed up to 700 people during full production. The Montana Job Service in Libby stated that Champion's future employment estimates indicate that only about 350 to 400 of the approximately 600 laid off individuals will be rehired due to automation and a decline in the timber market. According to the Montana Job Service in Libby, Champion also

contracts with several dozen logging companies which employ hundreds of loggers (Noranda DEIS, 1990).

On February 15, 1991, Champion closed down its Libby plant for an indefinite period. Up to 600 people who had previously worked with plywood, studs, and general duties were laid off (including an earlier lay off which took place in October 1990). These layoffs brought the unemployment rate in Lincoln County up to about 20 percent (Kootenai Valley Eagle, February 15, 1991). However, on April 29, 1991, Champion reopened and recalled 355 mill workers. The total number of people now working at the mill is about 420, approximately 200 less than originally employed. W.R. Grace closed its vermiculite mine located near Libby during the summer of 1990. This left about 60 people out of work. Twenty-five additional people may also be laid off by W.R. Grace.

The Libby Job Service indicated employment is highest during the months of April through November. Between December and March, however, seasonal layoffs occur, largely because of logging road closures due to the spring thaw, or breakup. These conditions make the area's forests inaccessible to loggers and logging trucks. The seasonal layoffs, according to DNRC, are part of the contractual agreements between Champion and the independent logging companies. The lowest unemployment generally occurs in July, when the unemployment rate is generally about 10 percent.

The Libby Job Service stated the 20 percent unemployment figure for Lincoln County quoted in the Kootenai Valley Eagle is fairly accurate, but it may be a low estimate as actual unemployment figures reflecting the seasonal fluctuations in Lincoln County's job market are not available.

Population - In recent years, the population of Libby and Lincoln County has fluctuated. Libby's population decreased by approximately 8 percent between 1980 and 1986. In 1988, however, the town's population had increased to 2,820, about 2.5 percent over its 1980 population (approximately 2,750). According to the 1990 census, Libby's current population is 2,532, 7.9 percent less than the 1980 figure of 2,750.

Lincoln County officials estimate there are approximately 3,000 households in the APCD. This figure is higher than the Libby population figure because the APCD includes many households that are outside of the Libby city limits.

Individuals over the age of 65 account for less than 20 percent of the Libby population (Noranda DEIS, 1990). People between the ages of 18 to 64 make up more than 50 percent of the population and those under 18 years of age make up less than 30 percent.

Income - The average wage for workers in Lincoln County in 1987 was $334 a week (Noranda DEIS, 1990). This amount represents a nearly 6 percent higher wage than the Montana average of $316. However, in 1986, per capita income for residents of Lincoln County was $9,379, according to the U.S. Department of Commerce. This income level is more than $5,000 less than the national per capita income and more than $2,000 below the state per capita income figure of $11,726 (Noranda DEIS, 1990). DNRC reported that between 1979 and 1987, the estimated per capita income in Libby and Lincoln County dropped compared to the state per capita income. Current income census figures are not available. The inconsistency between the average weekly wage rate and overall per capita income may be related to the seasonal fluctuations in employment in Libby and Lincoln County.

The 1980 census reported 11 percent of Lincoln County residents had incomes below the poverty level. More recent information, from 1987, indicates that up to 20 percent of county residents may be below the poverty level. This includes approximately 1,200 residents in the Libby area. Approximately 10 percent of the households in the county receive food stamps, Aid for Dependent Children, and other assistance. Approximately 500 households in the Libby area received Low-Income Energy Assistance Program (LIEAP) benefits during the 1990-91 heating season, according to regional administrators of the program. That amounts to about 17 percent of the households in the APCD.

Housing - There are 5,357 housing units in the Libby area, including vacant, seasonal, and migratory units (Libby Area Economic Profile, 1988). The profile states that 4,809 housing units are owner occupied and 1,218 are occupied by renters. Based on information provided by DHES, Lincoln County, DNRC reported that more than 75 percent of the homes in Libby are owner occupied, and the remaining 25 percent are rented. Nearly 25 percent of the housing units in Lincoln County are mobile homes, based on 1980 census data (Noranda DEIS, 1990).

The average monthly rent for a house in Libby is $250 and the average apartment rent is $225 (Libby Area Economic Profile, 1988). Although the cost of a house depends on its location, the average price of a 900-square-foot home with a basement or a 1,100-square-foot home without a basement is about $45,000.

Recreational Facilities - Libby is located in an area with a variety of recreational opportunities. The Kootenai National Forest and the Cabinet Mountains Wilderness Area offer wildlife habitat for deer, elk, bear, moose, Rocky Mountain bighorn sheep, mountain goat, mountain lion, grouse, and assorted waterfowl.

Libby Dam, Lake Koocanusa, and numerous lakes and streams offer fishing, boating, swimming, sailing, and water skiing. The area surrounding Libby is also used extensively for hiking, backpacking, camping, horseback riding, snowmobiling, and cross-country and downhill skiing.

The area offers numerous other tourist attractions such as dude ranches and golf courses. Also, Kootenai Falls and the Ross Creek Giant Cedars Scenic Area are located near Libby (Libby Area Economic Profile, 1988).

According to the Libby Economic Council, tourism in Libby is a significant portion of the economy. The University of Montana Bureau of Business and Economic Research reports that tourism makes up less than 10 percent of Libby's economic base. This, however, is a relatively significant figure considering that the wood products industry constitutes about 80 percent of the area's economy. Approximately 121,000 tourists visited the Libby Dam Visitors Center and project area during 1987 and 1988. Turner Mountain Ski Area averages 4,500 skier visits per winter.

Tourism has increased 31 percent over the past several years, according to the Libby Chamber of Commerce. The chamber also estimates that during the fall, summer, and late spring, tourism accounts for 28 percent of the region's total income. Libby's wood smoke concerns can be considered an important issue in developing a strong tourism industry in the area.

Energy Usage

Residents of Libby and the surrounding area rely heavily on wood for heat. In fact, the majority (about two-thirds) burn wood as the primary source of heat. A smaller percentage burn wood for supplementary heat. Many houses using wood heat also have some form of electric heat. In this case, electricity serves as a secondary heat source. Even though other heat sources may be available, "in Libby, people who burn wood do so for an average of almost 21 hours a day" (DHES report, no date provided).

In October 1988, the LCDEH, at the direction of the Libby Air Quality Committee, distributed an air quality questionnaire to 1,928 homes of registered voters in the rural fire district, which includes Libby. Eight hundred and fifty seven responses were received. One question asked was, "Do you have a wood burning appliance in your home?" Eighty-five percent of the respondents answered yes. Fifty-nine percent of the respondents said that the wood burning appliance provided 75 to 100 percent of their home's heat. Table 1 on Page I-7 provides the breakdown of current wood heating appliances in Libby. This information was obtained through PRC's interviews with

wood burning appliance professionals in Libby.

A DHES study (undated) estimated that 4,400 cords of wood were used in Libby in the 1988 - 1989 burning seasons. According to the DHES study, the average amount of wood burned per individual was over four cords per year. Libby residents prefer western larch, douglas fir, and lodgepole pine for heating purposes. Based on research by DHES, Lincoln County, and PP&L, DNRC reported that at least two-thirds of these wood burners collected the wood themselves, while other residents purchased it.

Many people collect wood from a pile of ends trimmed off of 2 x 4-inch boards (2 x 4 ends) that is located behind the Champion Mill. The 2 x 4 ends are excellent for burning as the wood is kiln dried and contains no paints or solvents. Many senior citizens depend on this supply. Champion, however, has modified its policy regarding this community supply. According to the county, the 2 x 4 ends are available to Champion employees, including those that have been laid off, and any excess 2 x 4 ends are available to the community.

Another source of wood is the pile of trimmed log ends, known as lily pads, also located behind the Champion Mill. These lily pads were sold by Champion for $17 per pickup truck load. However, Champion stopped selling these during the winter of 1990-91 because they were frozen together and posed a safety concern. Champion will begin selling them again in the spring. However, the lily pads may be green and unseasoned. Any lily pads purchased from Champion should be dried for a minimum of 6 months prior to burning.

As noted above, electricity is often used as a secondary source of heat, as is propane, and in some instances, oil. Natural gas is not currently available in Libby.

Other Concerns

Issues of concern regarding Libby's socioeconomic status include the recent Champion and W.R. Grace layoffs. There are also several other community issues relevant to Libby's current socioeconomic status and to residential wood smoke reduction efforts.

Forest Service Permits - During the 1990-91 winter, the Sierra Legal Defense Fund, representing the National Wildlife Federation, initiated action which could affect the price of wood collecting permits in the Kootenai National Forest. According to a Montana Chapter Sierra Club letter to the editor published in The Western News on January 30, 1991, the National Wildlife Federation asked that "... future decisions to sell firewood be accompanied by an environmental

impact statement or environmental assessment." These studies are meant to determine whether the sale of firewood affects air quality and human health. According to the letter, "such a study would undoubtedly consider whether Forest Service firewood permits are underpriced and are thus a subsidy that discourages investments in wood burning technology that could improve energy efficiency while reducing air pollution."

The USFS Regional Forest Administrator, John Mumma, has rejected efforts to require the USFS to restrict firewood gathering from the area's national forests. According to a March 1, 1991, article in the Kootenai Valley Eagle, Mr. Mumma said that the "air quality issue is most effectively resolved at the community level." As of the date of this report, firewood permit prices in the Libby area have not been affected.

Other Sources of Firewood - When considering how they would most like to improve air quality, Libby residents should note that the USFS firewood collection permits may again be examined, and Champion's 2 x 4 ends and lily pad piles are limited sources of firewood.

The community 2 x 4 end pile is only replenished with excess wood from the Champion employee pile. Unless a resident is related to a Champion employee or ex-employee, this wood source may be unavailable, especially since Champion's production has been reduced.

The Champion lily pad pile is a large source of wood, but is not unlimited. The lily pad pile exists because these particular pads are contaminated with gravel and cannot be chipped. According to Champion, this supply will not be replenished once it is gone unless additional lily pads are mistakenly contaminated with gravel.

Lifestyle Concerns - Many Libby residents interviewed by PRC were reluctant to give up wood burning completely because they consider it inexpensive and because collecting and burning wood has been a tradition in the Libby area for many years. Gathering wood is often a family activity or an event that takes place with hunting and fishing. On the other hand, many people said they are tired of burning wood because it is dirty, requires a lot of work, and can cause respiratory problems. Also, if the cost of purchasing or gathering wood increases or if its availability decreases, wood may no longer be a viable heating option for the people of Libby.

SECTION 5: APPROACH TO THE ANALYSIS

PRC's primary goal was to develop a workable wood smoke reduction plan for the Libby APCD. During development of the plan, PRC spoke with various elements of the community about reducing wood smoke pollution. Many community members were contacted for input and approached with regard to the implementation activities discussed in later sections of this report. The increased level of community awareness and involvement, together with the specific strategies presented in this report, will serve as a basis for achieving wood smoke reduction over the next 2 years.

PRC approached the analysis in three steps. The first step was to collect information. The second step was to review and analyze the information and develop options that could be useful for plan development. The third step was to develop an overall plan, drawing upon the most feasible strategies for implementation in the Libby community.

Step 1 - Collect Information

PRC began by collecting information from several sources, including written material and personal interviews. The written materials covered areas such as energy efficiency, energy costs, financing programs, wood heating in general, and similar programs in other communities. A copy of these materials was provided to LCDEH with this report. The personal interviews were conducted with knowledgeable people in and out of the Libby area.

To solicit community input for this plan, PRC traveled to Libby and spoke with several Libby area residents, employers, and officials. To ensure that consistent questions were asked and information was accurately recorded, PRC developed a Libby air quality questionnaire (see Appendix C). These questionnaires were completed during PRC's meetings with individuals and groups in Libby. The questionnaire included questions about heating habits and preferences, financial considerations, and other sources of information.

Through meetings with Libby residents and organizations, PRC obtained a broad picture of the resident's concerns regarding residential wood smoke pollution. PRC merged this information with air quality control information from a variety of other sources. Lincoln County requested that, along with obtaining new, relevant information, PRC use existing information to the greatest extent possible. PRC obtained the air quality survey distributed and tallied earlier by Lincoln County and also acquired several previous air quality studies completed on the Libby area air pollution problem.

The following list summarizes the individuals and groups that PRC spoke with to obtain information for development of this plan.

Information Contacts

Weatherization - PRC obtained an overall picture of weatherization from a representative of Schrader Wood Stoves and the Wood Heating Alliance (WHA). PP&L representatives from Libby and Kalispell described the company's existing weatherization program. For pricing information, PRC spoke with Boulder Lumber and Rocky Mountain Solar Glass, both located in Boulder, Colorado.

Electricity - PRC interviewed representatives of PP&L from Libby and Kalispell, Ryall Electric in Denver, Apple Plumbing and Heating in Denver, Cardinal Building Center and Joe Rucker's Plumbing and Heating, both in Libby, and the Bonneville Power Administration, to obtain technical information on using electricity as a heat source.

Propane - PRC contacted representatives from both Northern Energy and Petrolane to determine availability of propane. Technical information on propane heating devices and duct work required to install a propane furnace was supplied by representatives of Joe Rucker's Plumbing and Heating, Northern Energy, Petrolane, and Lennox.

Oil - Representatives from Joe Rucker's Plumbing and Heating, Golden State Oil, and Schrader Wood Stoves, and Lennox were interviewed for technical information about oil burning devices. A representative of Joe Rucker's Plumbing and Heating was interviewed about duct work required to install an oil furnace.

Natural Gas Line - PRC interviewed several utility representatives from Great Falls Gas Company and Montana Power Company on the feasibility of a natural gas line servicing Libby. A Lincoln County Commissioner and the LCDEH provided additional background information.

Coal - PRC spoke with the LCDEH to determine if coal was a viable option.

Other Fuels - PRC researched other fuel sources by contacting the Solar Energy Research Institute in Denver, the Rainflow Manufacturing Company in Denver, Northern Energy in Great Falls, and the LCDEH.

Idaho Department of Water Resources (DWR) - PRC gathered information about a pellet

stove demonstration project that took place in Idaho. The state coordinated the project, but it was implemented by community action agencies. The stoves were purchased with a mix of funding that included stripper well funds and oil overcharge funds administered by the state.

Another ongoing program in Idaho involves a revolving low interest loan fund for replacement of existing wood stoves with high efficiency pellet stoves. There is a 10-year repayment period and no income criteria for loan qualification. About 90 stoves have been purchased using this program and the criteria is periodically adjusted.

Leo Boyer, Manufacturer of Fire Logs in Newburg, Oregon - Mr. Boyer was contacted through the Wood Heating Alliance. Mr. Boyer owns Pride Furniture Company and uses wood shavings to produce 2-inch diameter fire logs. (The term fire log as used in this report refers to densified fuel logs made of compressed dry wood shavings with no chemicals or binders. Fire logs are commonly known as presto logs and by other commercial names, such as Northern Energy Logs.)

To produce the logs, Mr. Boyer uses newly designed log machines made in Italy. He is also a distributer of this log manufacturing machinery. PRC received several brochures and a video tape illustrating the machinery. This information was forwarded to the Libby Economic Development Council.

Representative of Boise, Idaho - PRC spoke with the coordinator of a stove replacement/conversion to other heating source program in Boise, Idaho. The representative explained the mix of funding that was used for this program. Funding sources included the following:

- Northwest Areas Foundation provided a $300,000 loan at 2 percent interest
- Idaho DWR provided a $300,000 zero percent interest loan
- Community Development Block Grant (CDBG) - Boise is an entitlement city, so no specific grant request was required. The program needed to demonstrate benefit to individuals that met the income requirements and also the housing rehabilitation criteria of the grant.
- EPA (through the Idaho Department of Environmental Quality) provided funding used for public relations and education activities.
- Gannett Foundation (publisher of a local newspaper) provided $10,000 for education and public service announcements.

Libby Job Service - PRC spoke with the Libby Job Service about the availability of job

training funds for positions such as wood stove installers and chimney sweeps. PRC also obtained information on Libby's economy and employment in the area.

Libby Economic Development Council - PRC met with the Economic Development Council and discussed the role it could play in exploring the possibility of local fire log production.

Lincoln County Department of Environmental Health - PRC spoke with the department regarding the financial considerations for the reduction effort. PRC also discussed community acceptance actions taken to date, issues of community concern, and concepts for additional strategies for community acceptance.

Eureka Pellet Mill Representative - PRC met with a representative of the Eureka Pellet Mill who expressed an interest in supplying pellets to pellet stove users in Libby. Possibilities for local bulk distribution include locating a storage area in Libby, such as empty silos.

Chairman of the Montana State Senate Finance Committee - PRC discussed the status and applicability of the Big Sky Dividend Program, certified wood stove tax credit, coal severance tax, and oil overcharge/well stripper funds.

Representative of PP&L - PRC discussed financing programs and incentives offered by PP&L. PRC also met with the representative to discuss opportunities to disseminate information to customers and to obtain information on the community and its concerns.

President of 1st National Bank in Libby - PRC explored the potential for a Clean Air Loan Program.

President of First Federal Savings Bank - PRC explored the potential for a Clean Air Loan Program.

Finance Officer for St. John's Hospital - PRC discussed possibility of using the hospital foundation as a means of obtaining grant money.

Representative of the Low Income Coalition - PRC discussed financial and educational concerns of low income homeowners, and special concerns of low income renters with regard to a wood smoke reduction program.

Representative of the Council for the Aging - PRC discussed financial concerns of senior

citizens, particularly those on fixed incomes, with regard to a wood smoke reduction program. PRC also obtained information on the community and its concerns for development of an educational program.

Representative of the Wood Heating Alliance - PRC discussed the coordination of a wood stove distribution program that could offer new wood stoves to residents at below retail prices, with the cooperation of stove manufacturers. PRC also discussed concepts for community involvement strategies and received information on good wood burning habits.

State Senator from Libby District - PRC discussed the status of the wood stove tax credit and the APCD. PRC also met with the senator to obtain information on the community and its concerns.

Representative of Northwest Areas Foundation - PRC discussed foundation funding of environmental programs.

Representative from the Oregon Bioenergy Program - PRC discussed various issues associated with production of wood pellets and fire logs.

Department of Energy, Denver Area Office - PRC inquired about low income energy assistance program and was referred to the Kalispell office of the Montana Department of Health and Human Services.

Representative of the Low Income Energy Assistance Program - PRC discussed program guidelines, the number of recipients in Lincoln County, and the availability of assistance for wood heating residents to purchase a new wood stove or convert to an alternative energy source.

Lincoln County Commissioners - PRC discussed the possible inclusion of wood smoke pollution issues in the Noranda Hard Rock Mining Impact Plan. Issues discussed included the projected increase in population, the additional homes occupied, and additional regulatory responsibilities of county personnel.

Lincoln County Planner - PRC discussed the status of the Noranda Impact Plan and the possible inclusion of air quality related impacts on Libby and Lincoln County resulting from population increases. PRC also met with the planner to obtain information on the community and its concerns.

Representative of OMNI Environmental Services, Inc. - PRC requested and received reports on wood stove performance and emissions.

Representative of the Montana Bioenergy Program - PRC discussed the program's funding of educational activities and the possibility of funding in the future.

Montana Hard Rock Mining Board - PRC discussed the purpose of the Hard Rock Mining Act and its applicability to Libby's air quality program.

Montana Department of Commerce - PRC discussed the CDBG criteria and applicability to Libby's air quality program.

Open Hearth, Wood Stove Retail Store - PRC spoke with the owner and collected information on the types, costs, and efficiency of wood stoves.

Representatives of the Kootenai Valley Credit Union (Champion) - PRC explored the potential for a Clean Air Loan Program.

Representative of the Big Sky and Lincoln Government Employees Credit Union - PRC spoke to the credit union about the wood stove replacement loan currently being offered.

Champion International Corporation - PRC met with Champion representatives to discuss firewood supplies, opportunities for disseminating information to employees and holding work shops and public meeting at the fitness center. PRC also obtained information on the community and its concerns.

Noranda Minerals Corporation - PRC met with a representative from Noranda to discuss opportunities to disseminate information to employees.

Libby Schools Superintendent - PRC met with the superintendent to discuss curriculum regarding wood smoke reduction.

KLCB Radio - PRC met with the radio station representatives to discuss public service announcements and news stories. PRC also obtained information on the community and its concerns.

The Western News and the Kootenai Valley Eagle - PRC met with reporters to disseminate information to the community.

The Montanian - PRC met with representatives from The Montanian to disseminate information to the community, to obtain information about the community's concerns, and to discuss opportunities for special interest stories.

Libby Respiratory Therapist - PRC met with the therapist to obtain information on community health and related concerns.

County Health Officer - PRC met with the health official to obtain information on community health and related concerns.

Local Wood Stove Dealers - PRC discussed community concerns, wood burning habits, and wood heating appliances.

HooDoo Mountain Pellet Mill - PRC met with representatives to obtain information about fuel availability and program assistance.

Allstate and Safeco Insurance Companies - PRC contacted these companies to obtain specific information on the number and types of wood stoves in Libby.

Libby Air Quality Committee - PRC met with the committee to discuss the project, the community, and its concerns.

Libby Fire Marshall and Firefighters - PRC met with the firefighters to discuss the community and its concerns and to obtain information on wood stove safety in Libby.

Libby Chamber of Commerce - PRC obtained information regarding Libby tourism and its economic status.

U.S. Environmental Protection Agency - PRC obtained information on residential wood smoke reduction and community involvement strategies.

Montana Department of Health and Environmental Sciences - PRC obtained technical, economic, and community information. PRC also discussed environmental characteristics specific to the Libby area.

University of Montana Bureau of Business and Economic Research - PRC discussed economic information regarding the Libby area.

PRC also met with the following groups and individuals to obtain information on the community and its concerns:

- Lincoln County Librarian
- Local citizens
- Mayor of Libby
- Libby Landlord Association
- Senior Citizens Center members

PRC spoke with the following state and local governments to design educational and community involvement strategies:

- Oregon Department of Environmental Quality
- Kalamath Falls, Oregon (Kalamath County)
- City of Boise, Idaho
- City of Missoula, Montana
- City of Helena, Montana

Step 2 - Review and Analyze Information/Develop Options

PRC reviewed and analyzed the information collected to develop useful options. Based on the information collected, it became clear that the best type of plan for Libby is one that provides the community with broad activities and provides individual wood stove users with a variety of strategies suitable for different lifestyles and financial circumstances. The highest level of participation can be achieved by presenting the community with several viable options, rather than focusing on any one alternative.

Activities to develop the options included the following:

- Examination of other community programs to determine what elements of the technical, financial, and education programs might apply to Libby
- Coordination with wood heating industry representatives, local wood stove retailers, and installers to develop plans for wood stove replacements
- Discussion with local financial institutions about developing a low interest loan program

- Development of a plan for soliciting grant monies through establishment of a local nonprofit organization
- Interaction with local media and educational groups to develop plans for local education programs
- Review of EPA guidance documents on community education programs
- Discussion with local providers of electricity, propane, and oil heat to examine the use of these fuels for most Libby residents
- Analysis of the feasibility of heating fuels, such as natural gas, solar energy, and water
- Tracking pending state legislation affecting Libby, including the establishment of the APCD and the continuation of certified wood stove tax credits
- Examination of the impact of weatherization on heating efficiency

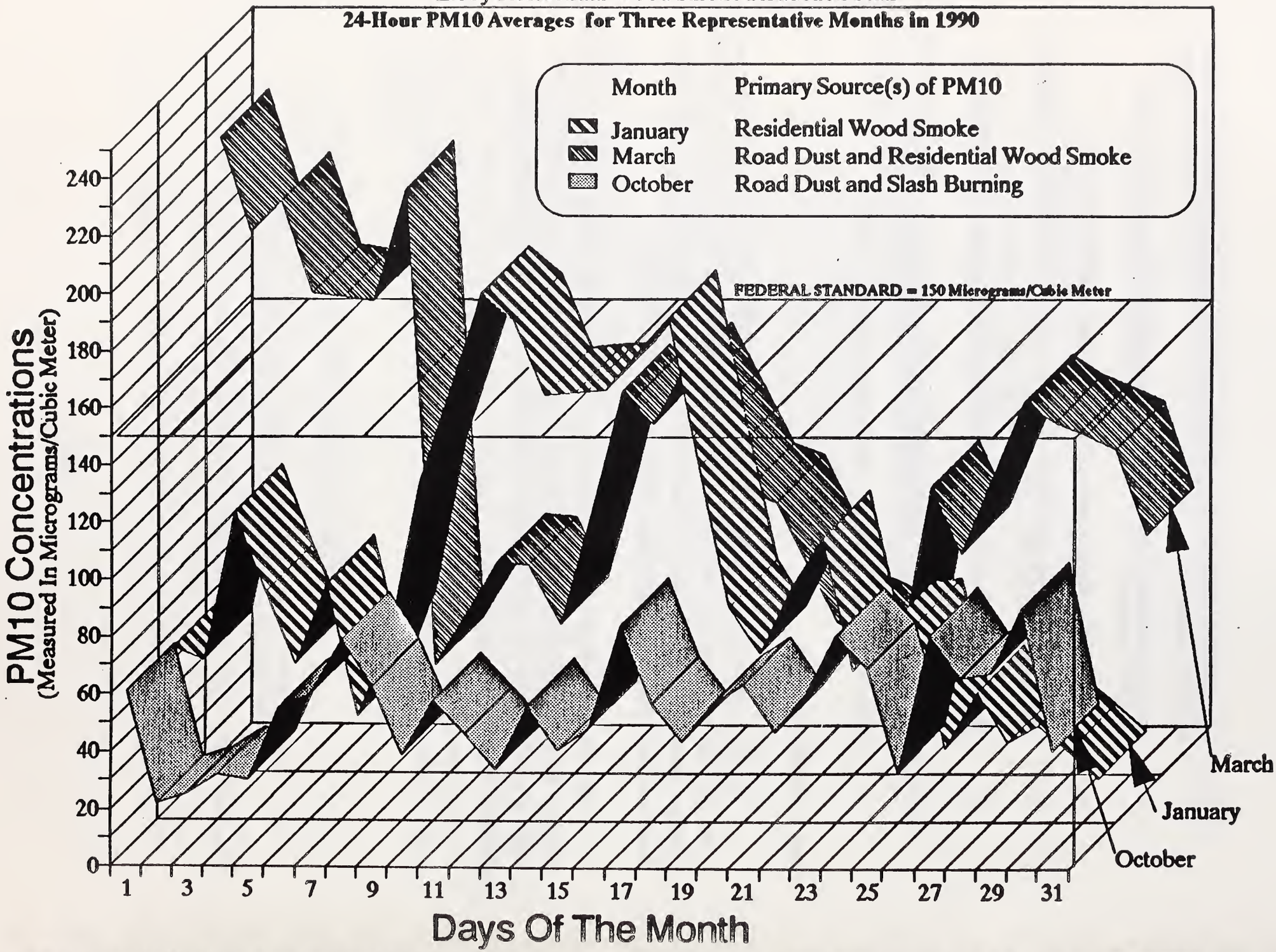
Step 3 - Develop Plan

The final step was to evaluate all of the options and merge them into a comprehensive wood smoke reduction plan. As discussed above, implementation of many of the activities discussed in this plan have already been explored with members of the Libby community. The plan which follows focusses on strategies deemed appropriate and workable for the community.

The draft plan was provided to the Libby community for review and comment in April 1991. An overview of the draft plan was presented by PRC at a public meeting of the Lincoln County Board of Commissioners on April 24, 1991. A summary of the comments received and their responses is provided in Appendix F.

Figure 1

Libby Residential Wood Smoke Reduction Plan



Note: The highest measurements of PM10 occur in January and March, when residential wood smoke is a primary source.

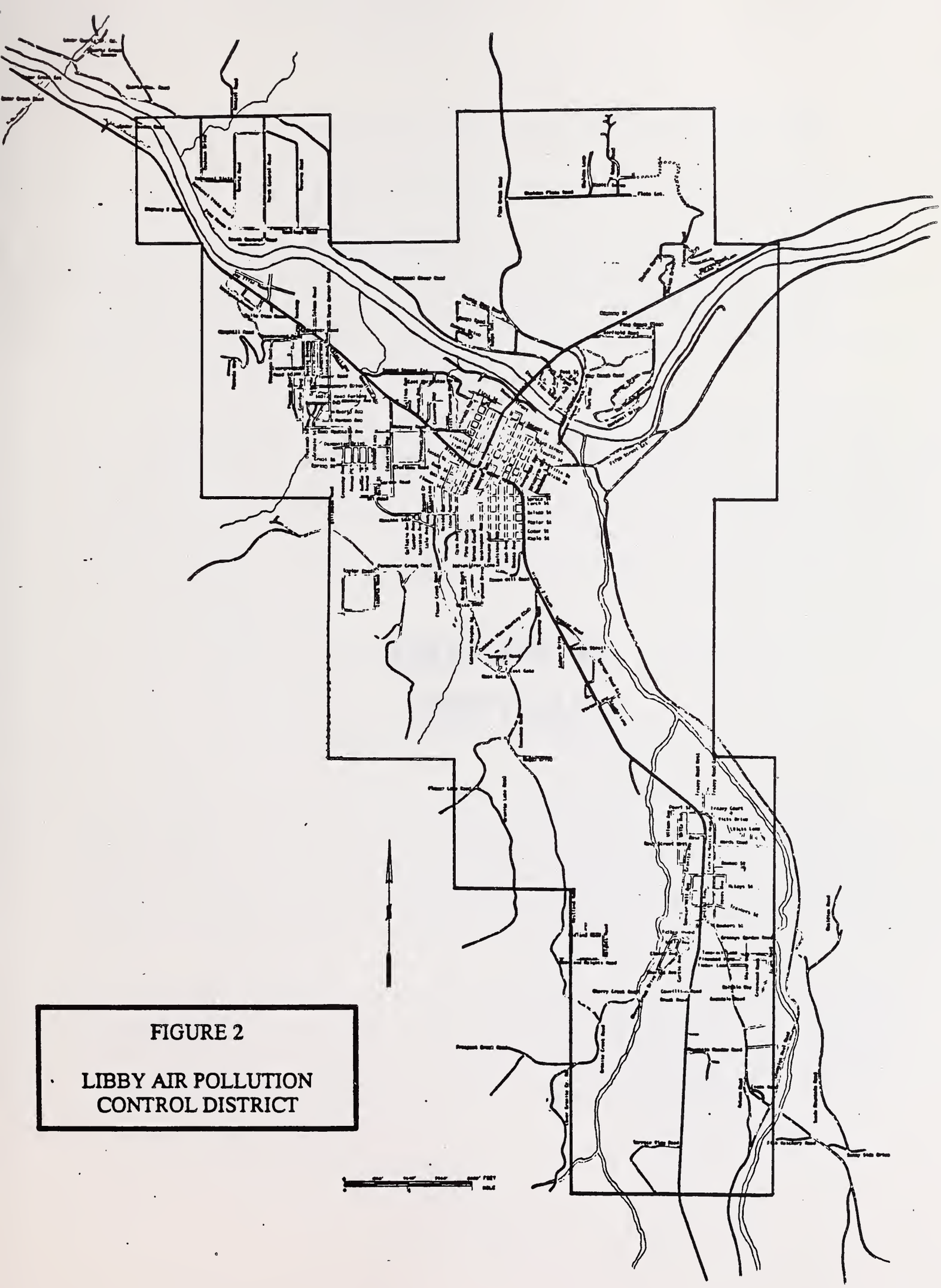


FIGURE 2

LIBBY AIR POLLUTION
CONTROL DISTRICT

CHAPTER II:
THE PLAN

SECTION 1: WOOD SMOKE POLLUTION REDUCTION STRATEGIES

The wood smoke reduction plan advocates four key strategies which can significantly reduce residential wood smoke pollution. These are discussed in Section 1. Section 2 gives specific recommendations of what to do with different types of existing wood burning devices. Section 3 provides a detailed discussion of available financing to implement the strategies. A program for community support and acceptance is presented in Section 4. Section 5 discusses activities for making the plan work and Section 6 discusses establishment of a Clean Air Fund. Finally, Section 7 presents a timetable for implementation of the plan.

The county believes that the pollution reduction goal will be achieved with actions selected by and tailored to each homeowner with a wood burning device. The ultimate solution will result from a combination of wood smoke reduction strategies. With increased community awareness and education, individuals can choose the combination of wood smoke reduction strategies best suited for their lifestyle and financial means. The following four strategies were selected based on their ability to reduce wood smoke, their ability to be funded, and their acceptability to the community:

- Weatherization,
- Eliminate or decrease dependency on wood by using an alternative fuel,
- Adopt new wood burning habits, and
- Replace old wood stoves with new clean burning stoves.

Table 2 on Page II-42 summarizes the four strategies along with their costs, financing sources, and emissions reduction potential. Because overall actions will depend on individual choices, it is appropriate to focus more on individual costs than costs to the community as a whole. To assist residents with estimating and funding individual costs, a cost worksheet is included as Appendix D. Residents should consult appropriate professionals, such as retailers of heating devices and lenders, when estimating costs and sources of financing.

In selecting and implementing appropriate wood smoke reduction strategies, it is important to understand all the options. An educated consumer can make effective decisions on what is most appropriate for his or her situation. Suggestions for in-depth education programs are discussed in Section 4. The following is a discussion of each wood smoke reduction strategy.

A. WEATHERIZATION

Some homes in Libby are very poorly weatherized. Weatherization is defined as improvements made to a residence to increase energy efficiency. Energy efficiency refers to the resistance of warm air inside a residence from flowing toward the cold air outside. Weatherization should be thought of as a complete package of tightening the residence of air leaks.

Weatherization includes (1) weather stripping and caulking around windows and doors; (2) installing double glazed or low E glass (higher grade insulation) windows and doors with adequate insulation such as foam; and (3) adding insulation to walls, floors, and ceilings. For weatherization to be most effective, all three of these components must be employed. When all three aspects of weatherization are completed, significant improvements in energy efficiency can be realized. According to PP&L, after a poorly insulated home is properly weatherized, up to a 50 percent reduction in energy use may be realized.

However, if only part of the weatherization process is completed, then only a small reduction in energy demand may occur. It is possible that no measurable reduction may be realized because warm air inside the residence may continue to escape through the poorly weatherized areas, such as an inadequately insulated attic.

Because of a home's age or structure, marked improvements in heating efficiency may not be realized, especially in mobile homes. However, some weatherization should take place in every residence. The result may be a significant decrease in wood use.

Depending on the type and amount of weatherization needed, the cost can vary from less than $100 to $2,000, according to PP&L. PP&L offers a free energy audit to its electric primary heat customers, which determines the weatherization needs of a specific residence. Section 5 of this report suggests that the county implement a similar energy audit program for residences not covered under the PP&L program at minimal or no cost.

Weatherization is not the complete answer for reducing wood burning and residential wood smoke pollution. Weatherization must be coupled with the installation and use of an appropriately sized heating source, whether it be an efficient wood burning device or a heating device using electricity, propane, or oil.

Homeowners should be sure that a heating device is properly sized for their home. An oversized heating device coupled with weatherization can actually overheat a home. This is an

inefficient use of energy and an unnecessary contribution to wood smoke pollution.

B. ELIMINATE OR DECREASE DEPENDENCY ON WOOD BY USING AN ALTERNATIVE FUEL

Electric, propane, and oil heat offer viable alternatives to wood burning and are the most practical and immediate alternative fuel sources in Libby. Increased use of alternative fuel sources will decrease dependency on wood. Most homes in Libby already use one or more of these alternative fuels as a primary or secondary heat source.

To determine which of these fuel sources is best for a particular situation, residents should consider several factors including cost, ease of operation, and heating potential. Initial costs for purchasing and installing a system are presented in this section, as are unit fuel costs. However, it is difficult to calculate an annual cost for use of these alternative fuels. The costs can vary significantly based on the size of the home, usage, and efficiency of the device, among other things.

It is extremely difficult to accurately estimate and compare the annual fuel costs of electricity, propane, and oil. Homes in Libby are heated using various combinations of heating sources and appliances. While one home may use a combination electric baseboard and wood stove, another home may be equipped with a propane furnace, electric wall heaters, and wood stoves. A third home may use an oil furnace and wood stove. Definitive values for the total seasonal cost to heat a typical home in Libby are not available. The following information is meant to give an overview of the component costs of heating sources and heating appliances. The cost worksheet in Appendix D should be used by residents to evaluate their individual costs.

Electric Heat - Approximately 50 percent of Libby area residences currently use electricity as a primary or secondary heat source. This amounts to about 2,500 homes. There are several types of effective electric heating devices. One type, such as a baseboard heater or wall heater, produces zonal heat. Zonal heating devices are intended to heat rooms individually. A thermostat can be used to adjust the heat room by room. A second type of electric heat source is an electric furnace. Another type of device is a water-to-air heat pump with duct work which heats the entire residence. A water-to-air heat pump extracts heat from a ground water source, such as a well. This heat is used to increase the temperature of the air inside the residence. To operate this device within the Libby city limits, a homeowner must be granted permission by the city council to use a well for this purpose. While the initial cost of a water-to-air heat pump may exceed $6,000 (including duct work), over time they can be an economical source of heat. According to a Libby dealer, it could take as little as 3 to 4 years to realize a savings of $6,000 through decreased electrical use.

Air-to-air heat pumps were also researched as a possible heating appliance. Considering the rather cold Libby climate, air-to-air heat pumps do not appear to be as good a heat source as water-to-air heat pumps. Although air-to-air heat pumps generally cost $500 to $1,000 less than water-to-air heat pumps (with the inclusion of duct work), they are not as efficient. When the outside temperature falls below 20 degrees Fahrenheit (°F), the air-to-air heat pump must use backup heating coils that are built into the heating system. These heating coils are a rather inefficient form of heat. Since temperatures below 20°F are common in Libby, the water-to-air heat pump appears to be a better alternative.

When estimating the cost of electric heat, the heating ability of the unit is an important factor. A water-to-air heat pump can produce more heat per kilowatt than either zonal heaters or electric furnaces. Electric heat is best used in well insulated homes so that the cost does not become prohibitive. Baseboard heaters cost approximately $8 per foot plus installation, according to Cardinal Building Center in Libby. The price of wall heaters is approximately the same as baseboard heaters. An electric furnace costs approximately $500 to $700, not including ductwork.

For the average home, nonheating requirements for electricity are met at 600 kilowatt hours and additional kilowatt hours are used for heating. For the first 600 kilowatt hours, the cost is 4.796 cents a kilowatt hour in the Libby area. After the first 600 kilowatt hours are reached during a month, the cost is 3.695 cents a kilowatt hour. The national average is over 7 cents per kilowatt hour, according to PP&L. A recent survey of electricity costs found electric rates in the Libby area to be among the lowest in the nation.

Propane Heat - Propane is an effective supplement to or replacement for wood burning. According to a local propane dealer, roughly 25 percent of Libby residences use propane as either a primary or secondary heating source. Propane is a relatively clean source of energy. Lincoln County also has a well established propane distribution network.

There are two basic types of propane heating devices. One is a stove which can cost approximately $250 to $500 and is designed to function as a space heater. The other type is a propane furnace which costs between $600 and $1,600. A propane furnace must be used in conjunction with a duct system and should be professionally installed. If no duct work is in place or improper duct work exists, installation costs may be an additional $200 to $2,400.

The current cost of propane is approximately $1.07 per gallon in Libby. The cost recently increased from about $0.80 a gallon, apparently the result of the deregulation of propane in 1989.

The cost also varies by season. The highest rates are usually in September and October with the lowest occurring from February through April. The seasonal difference can be as much as $0.10 per gallon.

Propane is more expensive than oil. However, propane furnaces can offer a possible future advantage over oil furnaces: propane furnaces can be rather easily and inexpensively converted to natural gas furnaces if and when a natural gas line is brought into Libby.

It has been suggested that propane could be purchased at wholesale prices for use in Libby. Even though wholesale rates are significantly lower, approximately $0.35 per gallon, the costs to initiate such a system could exceed $100,000, according to a Montana propane dealer. In addition, there are annual costs for employees and liability insurance. Bulk purchase of propane is not considered likely in the near future; however, it should be examined periodically to see if local propane use warrants such a system.

Local concerns about the safety of propane heating devices may be mitigated by propane gas detectors, which are available locally and offer improved safety. Information about these detectors, or safety in general, should be obtained from informed dealers.

A state law establishing regulations for installing propane furnaces in basements was passed by the Montana state legislature on April 4, 1991. Known as Montana House Bill 655, the regulations will take effect on October 1, 1991.

Propane furnaces can be used in tandem with a wood furnace, though only one of the furnaces operates at a time.

Oil Heat - According to a local oil distributor, approximately 50 percent of the residences in Libby use oil as a primary or secondary fuel source. There are several types of oil heating units on the market. Some can be operated with kerosene, or #1 or #2 fuel oil. According to Lennox in Dallas, Texas, new oil heating devices are relatively clean to operate and produce much lower air pollution emissions of hydrocarbons and sulfur dioxide than older oil heating devices. In fact, air pollution emission rates for new oil furnaces are so low that they are not usually mentioned on the furnace. Oil furnaces can also be used in tandem with a wood furnace.

The price of new oil space heaters range from $250 to $500. New oil furnaces range from $800 to $1,200. If no duct work is in place or if improper duct work exists, installation costs may be an additional $200 to $2,400.

The cost of #2 fuel oil in Libby is approximately $0.76 per gallon. In the early 1980s, the price was $0.65 per gallon and the price has fluctuated during the last decade. There are also seasonal cost variations similar to propane cost variations.

Natural Gas Heat - Currently, there is no natural gas pipeline to supply Libby. The investigation of potential natural gas service to Libby revealed that it is not a viable alternative for the near future (in the time period covered by this plan). According to regional gas companies and the DNRC, it would take a minimum of 18 months to 2 years to bring in a gas line after lengthy negotiations take place with an appropriate utility carrier or group of utilities. The cost has been estimated from $8 to $13 million. This could be partially paid by a local corporation or by residential hook up fees, the latter estimated at $5,000 per residence.

Natural gas service to Libby is a long-term solution to the air pollution problem and a potentially inexpensive form of energy, although it would require significant financial backing to initiate. Current natural gas prices favorably compete with the other major energy sources. As mentioned earlier, converting a propane furnace to a natural gas furnace is simple and inexpensive if gas becomes available. However, natural gas does not appear feasible as a means of decreasing Libby's air pollution within 2 years.

Solar Heat - Solar energy is used in some areas of the country as a primary or secondary home heating source. Solar energy can be used in a passive system, where the home is designed to absorb the sun's energy into the walls and floors during the day and radiate the energy back into the rooms as heat during the night. For an existing home, a retrofit system can be put into place. When considering the use of solar energy of any sort, weatherization should be completed first. This will prevent loss of heat in cold winter months. Installing a maximum amount of insulation and weather stripping initially will prevent further energy costs in the future. Once these tasks have been accomplished, and by allowing windows maximum exposure to sunlight, a simple "greenhouse effect" or passive solar system has been created. When planning construction of a new home, the builder should consider locating the home in an open area, so that a maximum amount of sunlight is absorbed by the walls, floors, and windows. Various manufacturers offer a selection of multipane windows suited for a passive solar system. The additional costs of these measures are highly variable and depend on items such as the age of the structure, the condition of the structure, and the structure's location. These conditions will also affect the pay back time for this system through heating cost savings.

In addition to a passive solar system, an active solar system can reduce fuel cost and air

pollution. An additional benefit is reduced costs for use of other fuels for heating of water. Active solar systems involve installation of specially designed units, typically on the roof of the home, which collect solar energy and transmit it into the home with a system of water pipes. To use an active solar system as a primary form of heat, one must live in an area that receives abundant and reliable sunshine throughout the winter. The home must also be located so that it receives full benefit from the sun. Incorporating a small two-panel air system along with a residual two-panel liquid system will generally absorb 70 percent of the home's hot water heating load and 18 to 28 percent of the home's air heating load. The initial costs of these units range from $5,000 to $6,000 for residential units, depending on the size and needs of the structure. Taking into consideration the fuel savings and estimated utility rate increases over the next few years, residents now using fossil fuels for heat should experience a 7 to 11 year payback time on their solar heating investment through heating cost savings. Homes currently using electricity for heat should have a shorter payback schedule of 3 to 5 years, due to the relatively higher price of electricity.

There are some problems associated with the use of active solar systems in Libby. These include the extreme temperatures, limited solar insolation, and heavy inversion problem experienced in the months of November, December, and January. Despite these unfavorable considerations, active systems are in use in surrounding areas such as Kalispell and Whitefish. If solar energy is being considered by the homeowner, it is recommended that a combined passive and active solar system be installed, along with backup heat from another source.

In special applications, this alternative for heat may be worth considering. Vendors of solar energy equipment in the area should be contacted for assistance in determining its costs and heating benefits. Some solar energy companies offer leasing plans for their systems.

Other sources - Other energy sources were explored for this report but were not recommended because they did not seem viable in Libby for the near future. For instance, nuclear power may seem attractive, but a nuclear power plant would take several years to build and permit. Also, the power generated by a nuclear power plant would end up as part of a regional power grid for a utility company such as PP&L. Cost savings in electricity would be distributed among the power company's region. Coal is not practical due to lack of distribution in Libby and inherent pollution concerns. Also, there is currently no extensive local network for the sale of coal stoves.

C. ADOPT NEW WOOD BURNING HABITS

The following is a list of wood burning habits which are generally low cost and can result in significant emission reductions. With few exceptions, these wood burning habits can be applied to

all of the types of wood burning devices.

Burn Fire Logs - Fire logs are made of compressed wood shavings. Fire logs can be burned in any wood stove, except for pellet stoves. These densely packed logs produce significantly more heat than the same quantity of regular firewood because of their quality, density, and dryness. Independent laboratory testing performed for Spokane Pres-to-log, a brand of fire logs, compared the fire logs to a fuel load of seasoned dimensional Douglas fir. At low and medium heat outputs, the fire logs produced approximately half the emissions of the cord wood and about one third greater heat output. Northern Idaho Energy Logs, Inc., the manufacturer of the fire logs currently sold in Libby, stated that fire logs provide 30 percent to 50 percent more heat than the same quantity of firewood. Therefore, one unit of fire logs is equivalent to 1.5 to 2 cords of wood.

Fire logs are currently sold in Libby for $105 per unit (240 logs). Cord wood is currently sold for about $65.00 a cord during the winter, according to vendor advertisements in local newspapers. Given these costs, and the increased heating efficiency of fire logs, the following cost comparison can be made:

1 unit of fire logs (240 logs) = 1.5 to 2 cords of firewood

1 unit of fire logs ——> $105 = 1.5 to 2 cords of fire wood (base price of $65 per cord) ——> $98 to $130

A DHES study estimated that the median wood usage in Libby was a little over 4 cords (estimated at 4.25 for the equations below) per household during the 1988 to 1989 heating season. The equivalent amount of fire logs is 2.13 to 2.83 units. Using this average and the above comparison, the annual cost of using fire logs can be approximated as follows:

2.13 to 2.83 units of fire logs x $105 ——> $224 to $297 = 4.25 cords of wood x $65 a cord ——> $276

This comparison illustrates that fire logs are competitively priced when compared to cord wood sold retail, and therefore, could be a financially viable option for residents who purchase wood.

Other advantages of fire logs that may appeal to residents include:

- Higher heat efficiency
- Longer burning time

- No bugs or insects
- Easy handling
- Less storage space

Burn Dry Wood - Wood does not burn efficiently when it is wet. Dry wood burns hotter and produces less particulates than moist wood. Even the most efficient catalytic and noncatalytic stoves will not operate at the manufacturers' specifications for low pollution emissions with wet wood.

Wood should be cut and split early in the year to promote seasoning or drying. Ideally, wood should be cut 6 to 12 months before it is used, then covered or preferably stored in a wood shed or other shelter. Residents should take advantage of the free log moisture testing currently being offered by the county to check the moisture content of their wood.

There is no cost to the homeowner to burn dry wood. There is a minimal one-time cost for a wood shed, if a homeowner chooses to purchase or build one.

Burn a Hot Fire - Many residents start a fire in the morning before going to work and then dampen it down to continue until they return in the evening. These fires can smolder up to 8 hours and create a large amount of unnecessary pollution. Many residents also dampen their fire before going to sleep at night to extend the life of the fire. These practices should be eliminated. Dampened wood produces a less efficient fire, and also produces more harmful pollutants inside and outside the house.

For fires to burn hot, the amount of wood used during each burning event should be consistent with manufacturer's specifications. Low polluting stoves generally can maintain a hot fire for over 6 hours, and are designed so they cannot be significantly dampened.

Institute a Stove Maintenance Program - A maintenance program should include regular chimney cleaning, replacement of worn gaskets, checking for leaks around the device and stove pipe, and cleaning the appropriate portions of the wood stove. Local chimney cleaning costs range from $15 to $50. For catalytic stoves, the catalytic convertor should be replaced every 1 to 3 years depending on wear and usage. The replacement cost is $100 to $120.

Burn the Right Type of Wood - Lodgepole pine, western larch, and Douglas fir produce the best quality firewood according to Wood Heat. Residents who purchase wood should look for

these kinds, as should residents who cut their own wood. The 2 x 4 ends provided by Champion are excellent for burning as they are kiln dried and contain no paints or dyes. The lily pad pile also contains wood that is good for burning as long as it is thoroughly dried. Costs for different types of wood will depend on availability and will vary, but the higher cost of some wood may be offset by higher burning efficiency. Burning treated wood, garbage, or paper should be avoided since they emit high levels of particulates.

D. REPLACE OLD WOOD STOVES WITH NEW CLEAN BURNING STOVES

Older wood stoves can emit up to 10 times the amount of particulates of newer wood stoves. The advantage in new stoves results from new technology and design improvements that, among other things, increase the air tightness of the stove. Emissions rates for new wood stoves are determined by EPA-certified testing and are reported by the manufacturer. It is important to note that the manufacturer's instructions for stove operation must be followed to realize the reported emission rate. New wood stoves fall into two main categories: cord wood stoves and pellet stoves.

New Cord Wood Stoves - Newly built wood stoves have emissions lower than 7.5 grams an hour and are EPA certified. Some stoves operate using a catalytic converter and some Libby residents already have new, low polluting stoves.

According to a local wood stove dealer and installer, a new stove and installation can cost between $1,200 and $2,000, with manufacturer incentives. For smaller homes and mobile homes, the cost will be closer to $1,200.

According to the WHA, consumers can expect a one-third reduction in wood usage by replacing an older wood stove with an EPA-certified new wood stove.

Pellet Stoves - Pellet stoves have very low emissions. Instead of burning wood, these stoves burn pellets comprised of dried and pressed wood wastes. A small amount of electricity is required to operate a pellet stove. A new pellet stove and installation can cost between $1,200 and $2,000.

If a significant demand for pellets develops in Libby, the county could explore the possibility of locating a central storage area for bulk pellet sales. This type of distribution system could result in lower pellet prices to residents. Representatives of the Eureka Pellet Mill have shown an interest in possibly developing such a system in Libby. Another local source of pellets is HooDoo Mountain Pellets in Libby. However, because HooDoo is a smaller operation, it will be less likely to be able to supply the community with large volumes of pellets. Approximately 1 ton of pellets is equivalent

to burning 1.5 cords of wood.

New Wood Stove Considerations

Residents that choose to replace existing stoves should consider the following factors to achieve maximum wood smoke reduction and heating efficiency.

- **Fit the Wood Stove to the Home's Heating Needs** - Residents should buy a wood stove that is appropriate for their residential heating needs. If the wood stove generates more heat than is needed, some homeowners may continue to burn the fire and open windows to cool the residence. This practice creates unnecessary pollution. Burning hotter fires in a smaller stove would be much more efficient from a heating standpoint and also less polluting. Local wood stove retailers are knowledgeable on how to size a stove and calculate fuel load and heat flow.

- **Properly Install New Wood Stoves** - When installing a new wood stove, all installation procedures recommended by the manufacturer should be followed. Under certain circumstances, special installation procedures are required. For example, extra care and attention is necessary when installing a wood stove in a mobile home. Wood stoves should be installed by qualified individuals. Installation considerations include:

  1) The proper type and size chimney, and

  2) The proper clearance distance between the wood stove and the walls and ceiling.

SECTION 2: WHAT TO DO WITH YOUR EXISTING WOOD BURNING DEVICE

Every type of wood burning device produces pollution in the form of particulates and gases. While some are designed to be very clean and efficient, others produce vast amounts of pollution in relation to the amount of heat they produce. This section describes the steps an individual with a wood burning device can take to decrease or eliminate pollution from the device. These steps are not listed according to priority or importance.

Fireplaces

1) Use fireplaces sparingly.

2) Add a very efficient fireplace insert with a low pollution emission rate that meets the emission standards set by the County regulations.

3) Close up the fireplace and eliminate its use.

Fireplace Inserts That Meet County Permit Requirements

1) Make sure the insert has been properly installed, which may include lining the chimney.

2) Make sure the insert is properly maintained.

3) Use fire logs in combination with wood or as a replacement for wood.

4) Adopt other appropriate wood burning habits.

5) Obtain a county permit for wood burning devices.

6) Weatherize to decrease wood use.

Fireplace Inserts That Do Not Meet County Permit Requirements

1) Make sure the insert has been properly installed.

2) Make sure the insert is properly maintained.

3) Use fire logs in combination with wood or as a replacement for wood.

4) Adopt other appropriate wood burning habits.

5) Replace the present insert with a permitted Class I or Class II insert (preferably a Class I).

6) Replace the present insert with a heating device that uses electricity, propane, or oil.

7) Weatherize to decrease wood use.

8) Observe all voluntary wood burning restrictions.

Wood Stoves That Meet County Permit Requirements

1) Make sure the stove has been properly installed.
2) Make sure the stove is properly maintained.
3) Use fire logs in combination with wood or as a replacement for wood.
4) Adopt other appropriate wood burning habits.
5) Obtain a county permit for wood burning devices.
6) Weatherize to decrease wood use.

Wood Stoves That Do Not Meet County Permit Requirements

1) Replace the present unpermitted stove with a Class I or Class II permitted stove (preferably a Class I).
2) Make sure the stove has been properly installed.
3) Make sure the stove is properly maintained.
4) Use fire logs in combination with wood or as a replacement for wood.
5) Adopt other appropriate wood burning habits.
6) Replace the present stove with a heating device using electricity, propane, or oil.
7) Weatherize to decrease wood use.
8) Observe all voluntary wood burning restrictions.

Pellet Stoves

1) Make sure the stove has been properly installed.
2) Make sure the stove is properly maintained.
3) Weatherize to decrease pellet use.
4) Obtain a county permit for wood burning devices.

Wood Furnaces

1) Make sure the furnace has been properly installed.

2) Make sure the furnace is properly maintained.

3) Use fire logs in combination with wood or as a replacement for wood.

4) Adopt other appropriate wood burning habits.

5) Add another furnace using either propane or gas in tandem with the existing wood furnace.

6) Weatherize to decrease wood use.

According to the local air pollution regulations, an individual cannot replace a wood furnace with another wood furnace. If an individual wants to eliminate the furnace, he or she can replace the present furnace with a heating device that uses electricity, propane, or oil, and also weatherize to maximize the heating increase efficiency of the new device.

Other Devices

Wood burning cooking stoves are not very common in the APCD. Most owners of wood burning cook stoves also own a more conventional cooking source. Wood burning cook stoves should not be banned, but their use should be restricted on high pollution days and they should also be maintained regularly.

There are other options for existing devices such as adding a pellet hopper onto an existing wood stove. However, this is usually not a good alternative. With a pellet add-on, improvement in the performance of the existing wood stoves is related to the compatibility of the existing stove with the pellet add-on. Only certain pellet add-ons will qualify for county Class I or Class II permits. Incompatible pellet add-ons do not provide a substantial reduction in emissions or increase in heating efficiency. In addition, pellet add-ons can be expensive, costing over $600. At that price, an individual could pay for most of a new wood stove or pellet stove. However, in some instances, a pellet add-on may be a viable alternative to using an unpermitted wood stove. Information on pellet add-ons and their compatible stoves is available from wood stove retailers.

A catalytic converter add-on is not recommended because of its cost and the uncertainty of improvement in the performance of the existing stove.

SECTION 3: FINANCING

Funding of Strategies

The following financial sources may be used to fund the strategies discussed in Section 1. The majority of these programs are already in place. However, the Clean Air Loan Program and the Clean Air Fund are sources whose establishment require action by the community. Also, the CDBG requires application by the community and would be contingent upon grant awards.

PP&L Zero Percent Interest Weatherization Loan Program - A home's primary heating system must be electric to be eligible for this program. That is, a home's electric heating system must be able to heat over 50 percent of the house. Customers must qualify for the loan based on their payment history with PP&L; however, the program is available to all eligible households, which is approximately 500 in the APCD. While this program would not apply to wood primary heat residences, it may result in less wood burning by those who use wood as a secondary heat source.

Under this program, PP&L will finance certain weatherization measures at zero percent interest. The maximum loan amount is $2,000 and the minimum is $200. The maximum term of the loan is 5 years. Payments are made monthly. A lien is filed on the property until the loan is paid off. PP&L will not subordinate its loan, so if there is a second mortgage, it has to be satisfied before PP&L files its lien. The loan is for existing structures only and not for additions to existing structures.

Qualifying measures include ceiling insulation, floor insulation, double glass or storm windows, weather stripping and caulking, wall insulation, and insulation of entry doors.

Low Income Energy Assistance Program Weatherization Benefits - This program helps improve the heating efficiency of homes and permanently reduces energy consumption. Not only does the program help low income people meet their energy needs, but it also allows them to conserve energy. An energy auditor assesses the home's needs for weatherization materials and determines the most cost-effective weatherization measures for the home. The audit is free and is conducted in the home. A crew is provided to install the materials and payments are usually made directly to the utility company or vendor. Weatherization materials are purchased locally whenever possible.

Approved applications are ranked according to degree of need. Special consideration is given

to elderly and handicapped people. Applications for this program are prioritized according to the amount of fuel consumed per household and area consumption. Generally, wood primary heat recipients are not a priority for weatherization.

Clean Air Loan Program - PRC contacted local financial institutions about developing a low interest loan program for funding new wood stove purchases by residents of the APCD. If possible, this program could also include conversions to alternative fuels and approved weatherization activities. PRC met with local banks and credit unions and discussed a loan program that would be suitable for local homeowners. The county should meet with these institutions and work to put a loan program into effect. PRC recommends the following guidelines:

- Loan maximum of $2,000 to $2,500
- Repayment period of up to 3 years
- An interest rate lower than on conventional loans

Community Development Block Grant - The CDBG program is administered by the Montana Department of Commerce. There are three funding categories: economic development, housing, and public facilities. Grant applicants must document that at least 51 percent of the nonadministrative funds requested go to low and moderate income families, as defined by the application guidelines. Both the city of Libby and Lincoln County are eligible to apply for this type of grant.

Grant applications for housing and public facilities projects are submitted annually in October. Nationally, there are three objectives of the CDBG program. According to the grant application guidelines, one of these is to "meet other community development needs having a particular urgency because existing conditions pose a serious and immediate threat to the health or welfare of the community where other financial resources are not available to meet such needs."

To apply, applicants must identify housing or housing improvement needs and the activities required to meet these needs. Public hearings must be held during these two steps. Qualifying needs include increasing the energy efficiency of home heating systems. The application must include a rationale for the project selected and completion of a needs assessment and citizen participation activities assessment. The rationale could include the increased energy efficiency of replacement wood stoves or other heating devices as well as the positive impact on the community's economy, such as tourism and new industry, as a result of reduced air pollution.

PP&L Low Interest Financing for Heating Conversion - This program is currently in place and the specifications may be revised soon so as to make the loan more attractive. The loan covers costs associated with conversion to electric heat. PP&L should be consulted directly for information on this program.

PP&L Zonal Rebate Program - This program is for existing construction only. PP&L offers a $15 per heater rebate for any zonal (space) heater installed. If the heater is for radiant heat, the rebate is $15 per kilowatt hour. This would apply to additions to existing homes, remodels, or conversions. The requirements include a thermostat separate from the heater and a heat anticipator, be it low voltage, electronic, or programmable.

Heating Device Manufacturer Incentives Offered Through PP&L - Heating manufacturers periodically offer free incentives for heating related items such as thermostats.

Low Income Energy Assistance Program (LIEAP) - Low income residents are encouraged to apply for assistance through this program which is administered by the Montana Department of Social and Rehabilitation Services. It pays part of winter energy bills for eligible people. Payments are made directly to local utility companies or vendors, except for wood heating benefits which are paid directly to the consumer. LIEAP benefits are computed to pay for winter heating costs only, not other utility costs. Benefits vary because payments are figured according to the size and type of home, and the type and cost of fuel.

The program does not permit recipients to convert to a more expensive fuel source. Because the benefit provided for wood in Lincoln County is currently lower than benefits for other fuels available in Libby, LIEAP is not suited for funding energy conversions. However, recipients of wood heating benefits that purchase wood should be encouraged to purchase fire logs. Section 1 above presents a cost comparison of wood to fire logs.

During the 1990-91 winter, approximately 500 households in Libby received heating benefits from the LIEAP program. At least half of the recipients rent their homes. Program administrators estimate that about 20 to 25 percent of the recipients in Libby receive benefits for wood heating.

The LIEAP determines eligibility for low-income households in Lincoln County. Eligible households receive assistance for their primary heating source from October 1 to April 30. Elderly and disabled households can file applications during July, August, and September. Benefits are generally sent directly to the fuel providers with the exception of households who have heat included in rent and households who request a direct wood payment. Benefits amounts are based on the

income of the household, type of dwelling, and number of bedrooms.

Homeowner - The homeowner can pay directly for some of the recommended strategies.

The Clean Air Fund - A Clean Air Fund can be administered by a local nonprofit organization, the establishment of which is discussed in Section 6 of this chapter. This fund can be used to provide financial assistance and rebates for approved weatherization and conversion activities, including new wood stove purchases.

Low Income Energy Assistance Program One-time Emergency Payment - For home owners that participate in the LIEAP, a one-time emergency payment of $250 may be available to the owners to replace or modify an unsafe heating system. If a wood stove is deemed unsafe by a certified wood stove installer, the homeowner may apply for the payment to repair or replace the stove, ventilation system, or other unsafe component. Participants would apply for these funds at the same location where they apply for fuel assistance. In the past, a branch office of the Human Resources Council has accepted applications on a seasonal basis.

Tax Credit for Certified Wood Stoves - An information bulletin should be developed and distributed by wood stove dealers and with each loan package about the tax credit currently offered by the state of Montana for purchases of new wood stoves. The tax credit guidelines have recently been revised. For stoves with emissions rates of 4.1 grams/hour and under, the credit, which is calculated based on the cost of the new stove and installation, is computed as follows: 10 percent of the first $1,000, and 5 percent of the next $3,000. For pellet stoves, the credit is 20 percent of the first $1,000 and 10 percent of the next $3,000. There are no catalytic stoves eligible for the tax credit. However, stoves on the existing list of qualifying stoves will quality for the credit through the end of 1991.

The list of qualifying stoves published periodically by the state should be distributed to the community at central locations, such as banks, credit unions, library, places of employment, and meeting locations for community groups. While these lists would likely be available at local wood stove retailers, providing them at other locations would encourage wood stove replacements.

Other Financing Sources

In addition to the financial sources discussed above, PRC also explored the following sources of financial assistance.

Hard Rock Mining Impact Funds - PRC spoke with the Montana Mining Commission's Division of Local Government about the applicability of Montana's Hard Rock Mining Act to the Noranda Mine, which is planned to open in the Libby area in 1992.

The law requires hard rock mining companies such as Noranda to compensate communities in advance for the impacts that the mining project will have on local services. Noranda was required by the law to submit a plan which projected the project's impacts on the local governmental units. The plan must be approved by the local officials before a final permit is issued by the state.

PRC spoke with local officials about potential residential wood stove impacts that might occur in the Libby APCD as a result of an increase in population due to the Noranda project. PRC examined Noranda's impact plan, which was completed in late 1990, and discussed the inclusion of air quality issues with Lincoln County officials.

Local population would likely increase for the construction phase of the project in April of 1992. This increase would consist of approximately 100 employees hired from outside of Libby. Population increases for operation of the mine would most likely occur around January 15, 1995, with approximately 90 people hired from outside of the Libby area. Current county regulations require stove permitting for new home purchases. Therefore, new residents who purchase new homes would be compelled to comply with the existing regulations. For rental units occupied by new employees, the responsibility for permitted wood stoves falls on the landlord.

However, an increase of occupied households in the APCD would increase the wood stove enforcement and compliance monitoring activities of Lincoln County. These activities include monitoring air quality, permitting wood stoves, and distributing information to residents of the APCD.

Although it is difficult to precisely quantify the residential wood smoke impact of incoming employees, the county should discuss the inclusion of these air quality provisions in the impact plan with Noranda. The impact plan could include a general statement that would allow for consideration of future funding to address the increased county services required for air pollution control activities related to the Noranda project.

Montana Department of Natural Resources Bioenergy Program - In November 1990, the bioenergy program provided matching federal funds to Lincoln County for funding various wood smoke reduction educational activities at the local level. These activities include moisture testing of fire wood, public service announcements, and distribution of information bulletins. The program is

aimed at energy efficiency and reducing residential emissions to encourage economic development.

Northwest Areas Foundation - PRC spoke with a representative of the Northwest Areas Foundation regarding the administration of the foundation's grant programs. The foundation is in the process of reviewing its grant programs and will not be issuing any new grants until July 1991. However, the representative indicated that grants for air programs will probably not be continued. Instead, the focus will be on land and water. The foundation previously issued a low-interest loan to the City of Boise that was used to make loans for wood stove replacements.

Big Sky Dividend Program - PRC spoke with a member of the Montana Senate Taxation Committee about the Big Sky Dividend Program Fund. The fund, which will use coal tax revenues, most likely will be used for water, sewer, and solid waste programs.

SECTION 4: STRATEGY FOR COMMUNITY SUPPORT AND ACCEPTANCE

On November 1, 1990, Lincoln County began a voluntary curtailment program for solid fuel (wood) burning devices in the APCD. According to the air quality regulations finalized in January 1991, if a 60 percent wood smoke emission reduction rate is not demonstrated by October 1, 1992, a mandatory burning curtailment program including citations and fines may be implemented.

In an effort to achieve the 60 percent or more compliance rate, a community support and acceptance strategy has been designed for the first 2 years of the nonmandatory period. After the 2-year time period, the effectiveness of this strategy and the voluntary program will be evaluated and restructured if necessary. This strategy has been developed based on the EPA "Guidance Document for Residential Wood Combustion Emission Control Measures," community input, and communication with other municipalities working to decrease residential wood smoke pollution.

The objectives of Libby's community support and acceptance strategy are as follows:

- Familiarize residents with the air quality control regulations
- Identify the residents' responsibilities under the regulations
- Justify the regulations
- Provide persuasion and reinforcement of the issues and principles behind the regulations
- Promote better wood burning practices and selection of alternative heating systems
- Encourage community involvement
- Communicate the potential health risk associated with wood stoves
- Reduce wood smoke emissions

The EPA "Guidance Document for Residential Wood Combustion Emission Control Measures" discusses three levels of effort that may be applied in implementing a community acceptance strategy. These are as follows:

- Minimal level-of-effort - Use of only one broadcast medium
- Medium level-of-effort - Use of a broadcast medium plus public comment
- High level-of-effort - Use of multimedia with extensive effort

For Libby's voluntary curtailment program, the high level-of-effort program should be implemented, including the use of multimedia and extensive community involvement. As noted in the guidance document, a high level of effort program would involve a "... comprehensive network of print, broadcast, and public contact/public education media ...."

The following subsection discusses community education activities regarding wood smoke which have taken place in the Libby area. A review of additional high level-of-effort community acceptance strategy alternatives designed specifically for Libby follows. The subsections discuss educational alternatives that may be implemented by the community, schools, businesses, government, and health officials. All of these alternatives should be implemented during Libby's voluntary compliance period.

Community Involvement

Several steps have already been taken by the DHES, DNRC, and LCDEH to involve and inform the public about the wood smoke problem and the recent regulations. The first community involvement step was the 1988 formation of a Libby Air Quality Committee. DHES met regularly with this group of local residents to assess Libby's overall air quality problem and design remedial actions. The current air quality regulations were reviewed and approved by the Libby Air Quality Committee.

Next, DHES, LCDEH, and the Libby Air Quality Committee established the APCD and distributed an air quality questionnaire to Libby residents in October 1988. The questionnaire asked for people's perceptions of the air quality issue, their heating habits, and their preferred remedies to the air pollution situation. Responses to this questionnaire demonstrated the community's awareness of the problem.

Discussions regarding the residential wood smoke problem have appeared in the local newspapers. County officials have spoken about air quality and wood smoke on the radio show "Voices of the Community" and have spoken to various service groups such as the Chamber of Commerce, Women's Club, Rotary Club, and the Libby Landlord Association.

Also, a billboard indicating daily air quality has also been placed on the county building lawn along California Avenue. This sign is adjusted daily to indicate the quality of the air.

Recent efforts have included community interviews for this study and a county mailing to APCD residents that included a fact sheet entitled "Burning Questions and Clear Answers," which

summarized air quality and local residential wood smoke regulations. Enclosed with the fact sheet was a permit application for existing wood stoves and a sticker listing the air quality telephone hot line number.

Activities for Voluntary Compliance Period

Table 3 on page II-46 outlines the following five activity categories for the voluntary compliance period:

1) Community education
2) School involvement
3) Business/employee involvement
4) Government programs/leadership
5) Health/medical involvement

Under the high level-of-effort program, individuals within each of the five categories will take part in an extensive community acceptance and education effort. Libby's aggressive public education plan will involve a broad base of community members, leaders, citizens, and business entities.

An element of volunteer contribution appears throughout this plan. Groups, businesses, and individuals who take part in the effort to educate the public should consider Libby's air an important issue, and should try to keep implementation costs as low as possible. The county should ask if discounts, group rates, donations, and other cost savings might be available as contributions to promote the program (such as weatherization materials and fire logs).

Community Education

Although all of the alternatives discussed in these subsections will result in educating the community, there are some alternatives that will involve and impact the community as a whole.

Cable/Educational Channels - Channels 4 (LCTV) and 19 in Libby are public and educational cable channels. These stations should be contacted to determine the requirements to broadcast wood smoke reduction advertisements, public service announcements, and brief video clips. If the costs are reasonable, the station, local community college, or high school audiovisual group should be contacted to determine their interest in creating various wood smoke-related television messages or programs.

Workshops/Neighborhood Meetings - County, community, and neighborhood leaders should organize workshops and meetings regarding wood smoke reduction issues. Topics may cover a range of issues including health effects, wood stove financing, wood stove installation, and wood burning habits. These meetings may occur in homes, schools, health facilities, community buildings, and service group buildings. Speakers influential in the community and familiar with the topic at hand should speak at these meetings. These workshops and meetings should be held monthly during the 2-year period and should be organized by county air quality personnel or interested community members. This topic is discussed in more detail below.

Newspapers - The three Libby area newspapers, The Western News, The Montanian, and The Kootenai Valley Eagle, have carried stories regarding the wood smoke problem, the Libby Air Quality Committee, and this project. Wood smoke reduction information should be provided to these papers as often as possible. Suggestions include additional coverage, public notice of meetings and opportunities for volunteerism, graphics demonstrating the air quality problem, and a monthly air quality/spotlight section. Representatives of the Montanian have shown interest in including a specific air quality section in their newspaper.

This air quality/spotlight section would regularly contain information about Libby's air quality and the people affected by the regulations. Items may include interviews and interesting facts. The monthly spotlight could focus on a Libby APCD resident who has adapted to the wood smoke regulations. It could provide a photograph of the individual and also summarize their methods of handling the situation. Occasional spotlights on area officials setting examples of wood smoke reduction efforts are also suggested (see Government Programs/Leadership below).

Radio - Public service announcements (regarding wood burning habits, volunteerism, etc.) and prepared air quality status announcements (such as, "The air is poor today, don't burn if you don't have a permitted stove and always use dry wood when you do burn") have been and should continue to be provided to the local radio station. Also, Libby residents familiar with the problem should be interviewed on the radio (such as local physicians and wood burning appliance professionals).

The local community college speech class should be contacted regarding developing public service announcements and prepared air quality status reports.

Volunteerism - Libby residents and service groups should be encouraged to help the air quality effort through volunteerism. Volunteer activities may include speaking to groups; moisture testing wood; stuffing envelopes; working with the logo contest (discussed below under school

involvement), possibly as judges; and helping senior citizens obtain and store dry wood. Opportunities for volunteerism should be developed through the Libby Air Quality Committee or by individuals in charge of air quality for the county. These volunteer opportunities should be advertised on the radio, in the newspapers, and on flyers placed at various service organization headquarters. Students of all ages should be encouraged to volunteer, possibly for collecting wood for senior citizens or developing logos and public service announcements.

Billboards/Road Signs - In addition to the air quality status sign located in front of the county building on California Avenue, an air quality status sign should be placed at other heavily traveled areas. Potential locations are on the south end of town on Highway 2, on the west end of town on Highway 2, or at the bridge to the north, on Highway 37. These signs should be maintained by county air quality personnel.

Along with the additional air quality status signs, wood smoke reduction billboards should be placed throughout the town. These signs would display the air quality logo developed by local school children (see school involvement below), and would also display brief facts about wood smoke, and slogans such as "Help Make it Clear, Volunteer" or "Help Clear the Air, Do Your Share."

Events/Fairs - The city of Libby, Lincoln County, and community members should either develop events and fairs based on wood smoke reduction or include this theme in planned events such as the Nordic Fest and Logger Days. A display area should be provided where individuals can ask questions about wood, wood stoves, proper burning, and stove installation. The displays should be staffed by county air quality officials and volunteers. Wood moisture testing should be provided in the display area as should brochures on health effects, proper wood burning, and other wood burning issues.

Wood burning themes could vary depending on the season. If it is a spring or summer gathering, the theme should revolve around collecting wood early, keeping it dry, and buying new wood stoves. If it is a fall or winter event, the emphasis could be on proper burning methods and health effects.

Fact Sheets - Fact sheets regarding wood burning should be developed by the county or obtained from DNRC and DHES, WHA, and EPA. Topics which should be included but need not be developed specifically for Libby are proper burning methods, health effects, efficient wood stoves, and other sources of heating energy. Local fact sheets should be developed discussing issues of concern specific to Libby, such as the local regulations, local health trends, and local reduction

programs and efforts.

The LCDEH has facilities to publish and print fact sheets. The Communities for a Great Northwest have also volunteered their facilities for development of fact sheets and other activities. The EPA document, "Guide to Public Awareness Materials on Wood Combustion," submitted as a separate supplement to this report, will be helpful in developing fact sheets and other public awareness media.

Public Speakers - As mentioned above, the county should organize public speakers to address issues of concern and to help individuals with specific wood stove financing concerns. Workshops where financial experts and individuals from the various credit unions or banks are available may be especially helpful to those with low incomes. Other public speakers should include health and wood appliance professionals.

School Involvement

Children should be educated on the wood smoke problem, health effects, and proper wood burning habits. Children should be made aware that wood smoke is a major community concern.

Logo Contest - A local middle school art class should, as a class project, take part in a contest for developing a Libby air quality logo. The contest could be run by the county or a volunteer, although the school's art teacher would coordinate the art work and related components. The county should provide the students with some basic wood burning information on which to base their art work. This information should be selected by the county and the art instructor.

The county could provide an award for the winning design. Volunteers and interested parties should serve as judges and the award should be given to the winner at a publicized ceremony.

The selected logo would then serve as the symbol for Libby's wood smoke reduction effort. The logo would appear on billboards, fact sheets, newspaper announcements, displays, and possibly t-shirts.

Curriculum - Libby School Superintendent Bill Donohue indicated interest among the teachers in incorporating information concerning wood stove smoke, health effects, weather inversions, and other air pollution-related topics in science class curriculum. A sample curriculum from the Oregon Department of Environmental Quality has been provided to the school district that outlines science projects and other issues of interest.

Business/Employee Involvement

Business/employee involvement could include a large number of people in the community. Encouraging businesses to distribute information to their employees and customers is an effective technique for community education.

Champion Fitness Center - The staff at the Champion Fitness Center, which is scheduled to remain open during the plant shutdown, is very interested in providing information and meeting facilities for the wood smoke reduction effort. Debbie Flannery, Champion Health and Fitness Administrator, indicated the company distributes a newsletter entitled Cross Cut every 3 to 5 weeks. The newsletter goes to all employees, including those who have been laid off. Information on air quality, wood stoves, proper wood burning, and health effects should be provided regularly by the county to Rudy Bullman, the Cross Cut editor, for inclusion in the Champion newsletter.

Ms. Flannery also said that Champion would distribute brochures regarding the issues and place information on fitness center bulletin boards. Brochures or flyers developed by the state, county, or EPA should be provided to Champion for distribution.

Ms. Flannery indicated that the Champion Fitness Center would be open for any meetings regarding wood smoke, wood stove financing, and health effects. Also, individuals from the Champion Credit Union should use this area to meet with Champion employees about financing options for purchasing wood stoves.

Noranda Employment Package - Noranda has indicated a willingness to provide information on the wood smoke problem in Libby, proper wood burning, health effects, and the air quality regulations in their new employee packages. The county should provide brochures regarding the wood smoke reduction effort when Noranda indicates that the mine will be developed.

Statement Mailings - Libby banks, credit unions, and power companies have agreed to include wood smoke reduction information provided by the county in their monthly statement mailings. The county should ensure that this method of distribution is implemented.

Small Business Development - HooDoo Mountain Pellets are produced and distributed in Libby. Fire logs are produced nearby. Information regarding these fuel sources should be made available to the community and representatives of these companies could be asked to attend local meetings and provide information on their fuel products.

A storage shed is an item that may be required to ensure that wood remains dry. Other towns with wood smoke problems have provided brochures describing how to make a storage shed quickly and easily. Public meetings, and radio, television, and newspaper interviews should discuss the economic benefits of designing and distributing premade storage sheds at a reasonable price.

Another opportunity for business development is wood stove installation. Due to the new air quality regulations and recommendation of this plan, many people may choose to buy new stoves and wood stove installations may greatly increase in number over the next 2 years. A current wood stove installer in Libby has indicated that he would be willing to train individuals in proper wood stove installation. In addition, a national installation certification test is periodically offered in conjunction with the WHA. This test is generally given at local community colleges and a minimum of five test takers is required. The county should consider working with the local community college and Libby Job Service to provide training and certification to individuals interested in wood stove installation.

Government Programs/Leadership

Air Quality Position - A full-time air quality specialist should be hired to assist the county in implementing the air quality program. This person would serve as a regulator, enforcer, and educator and would be responsible for implementing and maintaining the local air quality program.

This person could also serve as a liaison between neighborhood groups, schools, public speakers, volunteers, the media, and local businesses. The individual should be educated (preferably with a science degree, yet with a strong interest in sociology or psychology), with 2 to 3 years experience in local public administration programs (preferably not limited to the Libby area).

This person should work with the WHA, local banks and credit unions, and local wood stove dealers to implement the programs proposed in other sections of this plan.

Information Bank - The EPA "Guide to Public Awareness Materials on Wood Combustion," along with several original brochures and information, are included as separate appendices to this plan. These materials should be stored in an Air Quality Information Bank at the county offices. All information obtained from sources around the country and in Montana, including brochures, local publications, briefings from public talks, and workshop products should be stored in Libby's Air Quality Information Bank. This bank will serve as an information source for any individuals, either in the Libby area or elsewhere across the nation, seeking wood smoke reduction assistance.

This information bank should be maintained by county clerical staff under the direction of the air quality specialist.

Phone Advisory Calls - The air quality specialist may make a certain number of advisory phone calls (perhaps four) every week to provide information on wood burning and obtain feedback from the community. These phone calls could be to private homes, businesses, service groups, or schools. Through the phone calls, the specialist may provide brief bits of information regarding wood smoke reduction. This information may vary depending on the season. Information provided through these calls will be disseminated through the community by word of mouth.

Also, if possible, it might be helpful to have groups of people (perhaps service groups or volunteers under the supervision of the air quality specialist) make phone calls to the APCD residents in a phone-a-thon format to provide information about financial options available or to review proper wood burning habits. Information would be provided in a script format to ensure that the calls are consistent. This particular effort, however, may require substantial funding. The potential resulting costs should be considered before a Libby air quality phone-a-thon is attempted.

Events - As noted above under Community Education, Lincoln County and the county air quality specialist should schedule special events either separately or as part of Nordic Fest and Logger Days that could include wood stove fairs, public speakers, and an air quality exhibit booth. These activities should occur year round to encourage people to gather wood early, let it dry, and consider the health effects of wood smoke.

Hotline - LCDEH has already established a ventilation hotline which residents may call to hear a report on the day's air quality. The county has also distributed stickers with the hotline number to all APCD residents. This service should continue.

It may prove helpful to provide educational information as well as air quality information on the hotline. For example, the message could say "Libby's air quality today is poor. So tomorrow's air will be better, please remember to always burn dry wood," or "Libby's air quality today is good. Help keep the air clean by volunteering to gather wood early for our senior citizens."

Examples Set by Officials and County Employees - In an effort to ensure that Libby residents cooperate with wood smoke reduction measures, local officials and county employees should personally comply with the air quality regulations. Those who have changed their habits, energy source, or wood stove should encourage their neighbors and friends to comply with the regulations while the voluntary restrictions apply.

Moisture Meters - Lincoln County and DNRC have established a moisture metering station at LCDEH. This station should be advertised on the hotline, in newspapers, on television, in mailings, and on the radio. A moisture metering station should be made available at local events such as Logger Days and Nordic Fest. These stations should be staffed by the air quality specialist and volunteers. If the moisture meter station is not used, it should be moved to a different location with more traffic.

Health/Medical Involvement

Health Brochures in Medical Offices - Lincoln County has already distributed an informational brochure to all APCD residents. This brochure contained some health effects information. However, the county health official, the local respiratory therapist, and other interested parties should be encouraged to produce a brochure strictly on the health effects of wood smoke. These should be printed and distributed by the county to all APCD residents.

This brochure should also be placed in all medical offices in the Libby area, and other locations such as the Champion Fitness Center, schools, and the Lincoln County Library. Additional health brochures produced by EPA, the state of Montana, or possibly the National Institute of Health, should be obtained and placed in medical offices throughout the Libby area.

Health Symposium - Public speakers and workshops have been discussed at length in this plan. A health symposium or possibly health fair directed towards wood smoke and its health effects should be scheduled on a yearly basis. The health symposium or fair could consist of respiratory tests, informational lectures and videos, and wood moisture testing. In fact, the health symposium could be tied into an area-wide better health effort. This may help area residents understand how breathing wood smoke may relate to other syndromes and diseases.

This symposium or fair should be organized by the local medical society with the help of the county air quality specialist. The symposium could take place at three types of events or locations: (1) as a separate event in a local community room, (2) as part of Logger Days or Nordic Fest, or (3) as separate events at the schools. Those events held at schools could be part of the health curriculum, but could also run in the evening or on the weekend to include parents.

SECTION 5: MAKING THE PLAN WORK

To achieve maximum results from the four strategies outlined in Section 1, specific actions will be required by all segments of the Libby community, including government, businesses, and home owners. This section discusses these activities organized according to the four strategies. Table 4, located on page II-47, summarizes these activities according to who in the community will perform them. Section 6 provides a detailed discussion of establishment of a Clean Air Fund.

A. WEATHERIZATION

This section outlines activities community members can perform to implement the weatherization strategy.

- The county air quality specialist can offer energy audits for wood primary heat residences to assess weatherization needs.

- Local employers could assist their employees with funding for approved weatherization or conversion activities in the following ways:

  - A one-time payment made out as a check jointly payable to the employee and the appropriate retailer
  - A payroll deduction program to fund payments on conversion loans
  - A rebate to employees providing documentation of approved weatherization or conversion expenses

Such a program could be promoted and coordinated through the Chamber of Commerce.

- The county could work with local retailers, such as building centers and hardware stores, to arrange for promotional sales of weatherization materials. This could be in conjunction with a county education campaign for weatherization including workshops on do-it-yourself weatherization

- The county can apply for a CDBG to fund weatherization as an activity to increase home energy efficiency

- Local retailers could work with major suppliers to organize bulk sales of insulation

- Local retailers could work with major suppliers to organize bulk sales of thermal doors and double glass windows

B. ELIMINATE OR DECREASE DEPENDENCE ON WOOD BY USING ALTERNATIVE FUELS

This section outlines activities community members can perform to implement this strategy.

- The county could buy down interest rates for Clean Air Loans. This could be accomplished in the following ways:

  - Committing to deposit a specified amount of money in a lending institution, either in the form of a savings account or a certificate of deposit, and committing that the interest earned on the account be directed to buying down the interest rate on conversion loans

  - Making an up front payment to the lending institutions to buy down the interest rate on conversion loans

- The county could explore the possibility of a county tax credit to homeowners that document approved weatherization or conversion expenses. A tax credit form, similar to the one used by the state for new stove tax credits, could be used. The credit could take one of two forms:

  - A one-time credit given in the year that the expenses were incurred

  - A credit spread out over several years. For instance, those residents who take advantage of a 3-year conversion loan could receive a credit for each of the 3 years that the loan is outstanding

- The county could establish a Clean Air Fund through which financial assistance or rebates could be offered to homeowners in the APCD who present receipts for approved weatherization or conversion expenses. See Section 6 for a detailed discussion of the establishment of this fund.

- Local suppliers of propane and oil should give workshops on the use of these fuels, including information on different heating devices and costs.

- PP&L should give workshops on electric heating, including different heating devices and costs.

- Local retailers should work with manufacturers to provide sales incentives for electric, propane, and oil heating devices.

C. ADOPT NEW WOOD BURNING HABITS

This section outlines activities community members can perform to implement this strategy.

- Local community groups or retailers should develop a low cost wood shed for storing wood and keeping it dry.

- The county and Chamber of Commerce could promote the sale of fire logs by local retailers. Currently, fire logs are only available at one location in Libby, the Kootenai Transfer Company. Other retailers should be encouraged to sell fire logs.

- Local residents can purchase fire logs at a reduced rate from manufacturers such as Northern Energy Logs in Moyie Springs, Idaho, and others in Spokane, Washington or Coeur d'Alene, Idaho.

- Local organizations including service, youth, and church groups could develop programs for home delivery of fire logs to local residents that are purchased in bulk from the manufacturer. Delivery of fire logs could be particularly appealing to elderly residents who do not cut their own wood and may find the convenience of fire logs appealing. The county could subsidize the transportation costs associated with a delivery program.

- Fire log manufacturers and retailers could offer discounts to senior citizens and residents receiving benefits through the low income energy assistance program.

- To promote the use of fire logs, the county could give logs away to residents at Logger Days at a booth dedicated to wood burning education. A brochure explaining the advantages of fire logs could be distributed with the logs. An opportunity to try the logs at no cost could serve as a means of exposing residents to their burning efficiency and convenience advantages.

- Local retailers could offer give away logs as an incentive for future sales. This program could be coordinated through the Chamber of Commerce. The cost of distributing one log each to approximately 2,000 homes would be about $835, based

on current retail prices. That cost could likely be reduced if retailers seek promotional discounts from the manufacturer and purchase at the wholesale price.

- Local employers could purchase fire logs in bulk and distribute them to their employees at a discount price. This program could be coordinated through the Chamber of Commerce.

- The county should explore the possibility of producing fire logs locally.

D. REPLACE OLD WOOD STOVES WITH NEW CLEAN BURNING STOVES

To facilitate the replacement of older, high emission wood stoves, a wood stove distribution program should be developed to make new wood stoves available to area residents at wholesale prices. The WHA, a trade organization that represents the wood heating industry, has expressed interest in helping to coordinate such a program within the area. The county could assist by locating a central location for storing and selling wood stoves, perhaps an empty commercial property in town. The county could also oversee the program by having the air quality specialist serve as coordinator.

Stove manufacturers would agree to supply wood stoves for sale during a limited time period, presumably at lower than retail price. Local wood stove retailers, in conjunction with the county, could conduct the sales, handle all the paperwork, and arrange for delivery of the wood stoves. Installation and required chimney modifications would be the responsibility of the homeowner; however, county regulations require that homeowners ensure proper installation before a permit can be obtained.

Wood stove manufacturers will be most likely to supply stoves during the spring and summer when the demand for wood stoves elsewhere is relatively low. The WHA recommends working with manufacturers that currently sell stoves in Montana because local wood stove installers and service personnel are more likely to be familiar with these devices. PRC recommends the county promote the sale of wood stoves and the availability of this program year round. Promoting wood stove sales during the warm weather months will spread out demand for the services of professional wood stove installers. Also, the county should work with the WHA, wood stove manufacturers, and wood stove retailers to see that the appropriate type and size of wood stoves are sold to homeowners. An information bank providing information on the different types of stoves available and the proper use of the stoves should be established at the selling location.

SECTION 6: ESTABLISHING A CLEAN AIR FUND

A Clean Air Fund could serve as a funding mechanism for many of the strategies outlined in Table 2 and discussed in Chapter II, Section 1. The wood goals of the smoke reduction program would be best served by a public-private funding partnership, including EPA, Lincoln County, and private donors. This mix of monies, support, and involvement could also include most segments of the Lincoln County and the Libby community. Involvement at the community level will promote the success and continuity of a project, particularly if the community shows support for such a project in the initial efforts to gain outside financial support.

The development of this fund raising concept is a step-by-step process. Each step leads systematically to the next step and all are necessary to promote the success of the project. The five steps are as follows:

Step 1: Funding Mechanism for the Project - a Nonprofit Corporation

Rationale for This Approach

- Donors will not donate to a community's administration such as Lincoln County. Donors may suspect that the money will not be utilized for the designated purpose, particularly as administrative and political agendas change in the community.

- A governing board of directors geared toward the specific purposes of the project will allow more direct and sensitive focus to the concerns at hand.

- Short- and long-term fiscal responsibility, accountability, and success are better assured when the decision-making power lies with the directors.

Establishing the Funding Mechanism

- Establish a private, nonprofit corporation.

- Apply for nonprofit corporate status from the state of Montana.

- Once application for corporate status is granted, apply to the Internal Revenue Service (IRS) for an educational 501(c)(3) tax exempt status to act as the funding mechanism to receive, hold, and disperse the supporting funds. It takes about 4 to 6

months to acquire IRS designation.

- If a temporary funding mechanism is needed, one can negotiate a temporary arrangement with a local tax-exempt entity, such as the hospital foundation, for 6 months to a year maximum.

Mission of the Project

A mission statement should be developed that answers the question, "Why does the organization exist?" The focus could either be tied specifically to the residential wood smoke reduction efforts or represent a broader spectrum of issues, including environmental concerns and quality of life issues faced by the community now and in the future. A broader focus, such as quality of life, may be preferable to widen the potential for support.

The development of a mission statement is a critical item the project's ability to receive funding. The mission statement can be developed by the county and local community.

Step 2: Project Governance

In any nonprofit effort, the board of directors is important as a governing body. The board's makeup could include the following segments of the community:

- Chamber of commerce
- Utility companies
- Vendors of wood products and services
- Air quality specialists
- Health and environmental specialists
- Fuel suppliers
- Residents, such as senior citizen, family, youth, and low-income representatives
- Members of the Libby Air Quality Committee may be good candidates to serve on the board of directors for such a project.

The governing body will act as the decision makers, priority setters, fiscal managers of donations, liaisons to the community, and advocates for community residents to be served. As advocates of the effort, the board of directors can provide the coordination necessary to see the

project through to completion. By providing a continual forum for the county, city, and community, the board of directors offers the specific focus necessary to achieve success.

Step 3: Project Fund Raising Plan

Today's fund raising climate requires development of a comprehensive plan to acquire the necessary financial support. This plan could include answers to the following questions:

- What is the financial goal, including the cost of raising the funds for the campaign?
- How should the need for the funds be articulated for today's competitive market?
- How can the needs be raised to a top priority in community's funding?
- What research will be needed to locate the appropriate funding sources?
- What are the specific tasks necessary to reach the financial goals of the campaign?
- What particular needs of the campaign will appeal to which potential donors?

Step 4: Philosophical Issues Associated with the Project's Success

The basic rules of fund raising can be applied, including the following:

- Donors give money to meet their own needs.
- Participants in this process should be considered investors and given specific ideas regarding how much to give, what their money will make possible, and how they will specifically benefit.
- The closer the involvement of the potential donors to the solution, the more likely they are to give support.
- Persons, agencies, businesses, and others who benefit from the solution must be among the first to give.
- The governing entity (board of directors) must agree to donate. This action indicates

their willingness to buy into the idea and personal commitment. This enables them to encourage others to give support and provides early seed support to get the project off the ground. These donations, even if only a small amount, are symbolically important.

Step 5: **Specific Funding Sources - Categories of Donors** (See list in Appendix E)

- All the board of directors and other involved parties
- Civic associations and clubs in Lincoln County and Libby
- Corporations having headquarters or regional offices in Montana
- Individuals that donate to environmental agencies and projects
- National foundations that have funding criteria with an interest in elements such as:
  - Local self determination
  - Regional or national environmental action, especially air quality
  - Family health
  - Western states self government/empowerment
  - Preventive health issues
- Libby Chamber of Commerce
- Montana Tourism Board
- Montana State Agencies
- Lincoln County and City of Libby

This process is recommended to assure the short- and long-term success of the project. By acting on the incorporation and tax-exempt status, and by immediately soliciting a broad-based board of directors, early success could be seen.

The funding community, including those entities listed in Appendix D, cannot be attracted and should not be approached until these initial steps are taken. As discussed above, the combination of public and private support for a nonprofit entity such as a Clean Air Fund will not only achieve the necessary funding base, but will also provide the broad base of support important to maintain a project.

SECTION 7: TIMETABLE

This section outlines a schedule for implementation of the wood smoke reduction plan. Table 5 on page II-49 is a specific timetable for activities and strategies discussed in the plan.

Regulatory

The Residential Wood Smoke Reduction Plan intends to reduce ambient airborne particles from wood burning which contribute to local violations of the federal air pollution standards. A total reduction of approximately 60 percent of PM10 levels is necessary to assure compliance with federal standards. The reduced levels must be maintained even if the number of sources increase due to population or industrial increases.

The Lincoln County Board of Commissioners has established a comprehensive program for achieving federal air quality standards for PM10. Wood stove burning compliance in the first 2 years (through October 1992) of the program is voluntary. Mandatory restrictions on wood burning will go into effect in October 1992 if the air quality goals are not achieved.

Ultimately, the federal government can impose sanctions on Montana if areas such as Libby do not achieve compliance with federal air standards. The federal government can withhold federal funds to the state, prohibit some forms of growth in the Libby area, and withhold permits for new industrial activities. The new 1990 Amendments to the Clean Air Act give EPA greater authority to enforce air quality standards.

Community

Although all of the community education and involvement efforts discussed in this plan should take place throughout the 2-year voluntary compliance period, several activities should be implemented as early as possible. The informational brochure and hotline are two activities that have already been developed and implemented. Additional up front activities that would be effective include development and dissemination of a wood smoke reduction logo, educational and informative billboards and road signs, statement mailings, health brochures, officials and county employees setting examples, and possibly phone advisory calls. It may also be effective to begin a regular air quality section in the local newspapers.

These efforts should be performed early in the compliance period to inform, encourage, and educate the residents. Additional activities over the 2-year period and potentially into the future will

be important to keep awareness high. Workshops, held by local professionals, should provide information on weatherization, fuel conversion, new wood stoves, and available financing. Initially, a strong impact should be made to show the residents that the county is determined to achieve the air quality goals.

Technical

The four wood smoke reduction strategies in this plan should be implemented in stages. First, a homeowner should determine their weatherization needs by having a weatherization audit. The audit will determine how much benefit there would be from weatherization. For those using electricity as a primary fuel source, PP&L offers an effective weatherization audit. For the remaining homeowners, a weatherization audit developed by Lincoln County could be completed. Once the audit is completed and evaluated, the homeowner should attend workshops and weatherization should begin.

After weatherizing, the homeowner should consider increasing use of alternative fuels such as electricity, propane, and oil. After consulting with a professional or attending an educational workshop, homeowners should begin to upgrade or install appropriate heating devices for alternative fuels. Homeowners that continue to burn wood should learn and adopt good wood burning habits. For instance, homeowners should cut wood early and maintain a clean stove and chimney. The community could assist the homeowners by selling fire logs and promoting low cost wood sheds.

A homeowner who decides to purchase a new wood stove should learn about stoves by talking with a dealer or attending a workshop before purchasing a new stove.

Financial

While several of the financing programs are already in place, some will require actions by community members. The Clean Air Loan Program should be established by the financial institutions in the early stages and continue through the duration of the program. The ability of homeowners to implement the recommended strategies will depend, among other things, on the availability of the loans. Also, the initial steps for establishment of a Clean Air Fund nonprofit organization should be undertaken as soon as possible. It can take 4 to 6 months for nonprofit Internal Revenue Service tax status to be acquired. Finally, Lincoln County or the city of Libby should apply for a CDBG in October.

TABLE 2

RECOMMENDED WOOD SMOKE REDUCTION STRATEGIES

STRATEGY	COSTS	FINANCING*	REDUCTION IN EMISSIONS	PROS AND CONS
A. WEATHERIZATION				
• Thermal doors and double glass windows	$130 to $250 per window, $250 to $800 per door	Clean Air Loan Program Clean Air Fund PP&L Weatherization Loan Community Development Block Grant Low Income Energy Assistance Program Homeowner	Reduction is related to increase in building efficiency. Less fuel is used to heat the house.	Results in fuel cost savings. Some measures can be done by homeowner. Benefit depends on age, size, and structure of home. PP&L offers weatherization consultation to electric primary heat customers. Proposed air quality specialist can provide similar services to other homeowners.
• Weather stripping and caulking around doors, windows, etc.	$10 to $50 for materials			
• Insulation of walls, ceiling, and floors	Approximately $0.50 per square foot of insulation. Total weatherization cost ranges from $100 to $2,000. One time only cost; minimal annual maintenance required.			
B. ELIMINATE OR DECREASE DEPENDENCY ON WOOD BY USING AN ALTERNATIVE FUEL				
• Electricity	Base board - $8 per foot Water-to-air heat pump - up to $4,000 plus costs for ductwork Fuel cost - $5 monthly fee plus 4.796 cents per kilowatt hour (kwh) for the first 600 kwh; 3.695 cents per kwh for all additional[1]	Clean Air Loan Program Clean Air Fund PP&L Low Interest Conversion Loan PP&L Zonal Rebate Program Heating Manufacturer Offers	Dependent on resulting reduction in wood burning. Air emissions from electricity are non-existent. Up to 100 percent reduction in wood smoke emissions.	Residents can either convert to electricity as a primary heating source, or increase dependency on electric heat, thus reducing dependency on wood. A water-to-air heat pump requires appropriate ductwork.

* See Section 3 for detailed information on financing sources
[1] Source: PP&L; National average is over 7 cents per kwh
[2] Source: Rucker's Plumbing and Heating, Petrolane, and Northern Energy
[3] Source: Petrolane and Northern Energy

TABLE 2 - Continued

RECOMMENDED WOOD SMOKE REDUCTION STRATEGIES

STRATEGY	COSTS	FINANCING*	REDUCTION IN EMISSIONS	PROS AND CONS
B. ELIMINATE OR DECREASE DEPENDENCY ON WOOD BY USING AN ALTERNATE FUEL - Continued				
• Propane	Furnace - $600 - $1,600 plus costs for ductwork[2] Space heater - $250 - $500 per heater Fuel cost - $1.00/gallon[3]	Clean Air Loan Program Clean Air Fund Heating Manufacturer Offers	Dependent on resulting reduction in wood burning. Up to 100 percent reduction in wood smoke emissions.	Distributors may offer cost incentives for furnace or space heater purchases. Local propane distribution network is well established. State legislation pending to allow propane heating devices in basement.
• Oil	Furnace - $800 - $1,200 plus costs for ductwork[4] Space heater - $250 - $500 per heater[5] Fuel cost - $0.76/gallon for #2 fuel oil, most common fuel	Clean Air Loan Program Clean Air Fund Heating Manufacturer Offers	Dependent on resulting reduction in wood burning. Up to 100 percent reduction in wood smoke emissions.	Distributors may offer cost incentives for furnace and space heater purchases. Newer furnaces and heaters are cleaner to operate then older versions. Cost of fuel can be volatile, based on market conditions.
• Natural Gas	Up to $13 million to bring in gas line (up to $5,000 per house for hook-up). This does not include a furnace and ductwork.	To be determined	Significant reduction over wood heat.	Not currently a viable option, but may be in the long-term. Would take at least 3 to 4 years. Would require local corporate support and county sponsorship.
C. ADOPT NEW WOOD BURNING HABITS				
• Burn fire logs	$100/unit (240 logs) Annual Cost - $213 to $283	Homeowner Low Income Energy Assistance Program	Up to 50 percent (according to North Idaho Energy Logs, Inc.)	Can be used in any cord wood furnace or stove. Convenient to store and transport. Must be kept dry. Burns much hotter and cleaner than cord wood.

* See Section 3 for detailed information on financing sources
4 Golden State Oil and Rucker's Plumbing and Heating
5 Golden State Oil

TABLE 2 - Continued

RECOMMENDED WOOD SMOKE REDUCTION STRATEGIES

STRATEGY	COSTS	FINANCING*	REDUCTION IN EMISSIONS	PROS AND CONS
C. ADOPT NEW WOOD BURNING HABITS - Continued				
• Burn dry wood	None or minimal one-time investment for wood shed	Homeowner	Can be significant	Wood must be kept covered and dry. Residents can have logs moisture tested by county. Dry wood must be burned in new wood stoves to achieve low emissions. Wood should be cut in the spring or the year before and allowed to dry 3 to 6 months before use. An inexpensive shed can be built for wood storage.
• Burn a hot fire	None	Not applicable	Can be significant	When fire is allowed to smolder, emissions greatly increase. Therefore, do not dampen fire.
• Stove maintenance program	$15 - $50 for chimney cleaning (annual) For catalytic converter stoves, $100 - $120 to periodically replace the catalytic converter every 1 to 3 years	Homeowner	Can be significant	Maintenance also reduces potential for chimney fires. For catalytic stoves, catalytic converter should be replaced at least every 3 years. Wood stove and chimney should be cleaned out at least once a year.
• Type of wood used	Varies	Homeowner	Varies	Burn quality wood such as lodgepole pine, Douglas fir, or larch. Avoid burning treated wood or paper.

* See Section 3 for detailed information on financing sources

TABLE 2 - Continued

RECOMMENDED WOOD SMOKE REDUCTION STRATEGIES

STRATEGY	COSTS	FINANCING*	REDUCTION IN EMISSIONS	PROS AND CONS
D. REPLACE OLD STOVES WITH NEW CLEAN BURNING STOVES				
• Certified cord wood stove (catalytic or noncatalytic) to include fireplace inserts	$1,200 to $2,000 for stove and chimney modifications. Off-set by state tax credit on certified stoves	Clean Air Loan Program Clean Air Fund Stove Manufacturer Offers Low Income Energy Assistance Program Emergency Payment	Up to 90 percent	New stove will probably require chimney modifications. Purchasers should compare stove emissions rates with county Class I and Class II permit requirements. Must discard old stove when replacing with new stove. Must properly operate new stove to attain manufacturer-specified low emissions rates. Must purchase stove that is properly sized and fitted for specific residence. Noncatalytic stoves tend to require less service. Must be professionally installed for proper operation. Manufacturers may offer cost incentives for new stove purchases.
• Pellet stoves	$1,200 - $2,200 for stove and chimney modifications Off-set by state tax credit on certified stoves $80 - $100/ton for pellets	Clean Air Loan Program Clean Air Fund Stove Manufacturer Offers Low Income Energy Assistance Program Emergency Payment	Up to 95 percent	It appears that all pellet stoves currently sold meet county Class I permit requirements. New stove will probably require chimney modifications. Must discard old stove when replacing with new stove. Must properly operate new stove to attain manufacturer-specified low emission rates. Must purchase stove that is properly sized and fitted for specific residence. Must be professionally installed for proper operation. Manufacturers may offer cost incentives for new stove purchases.

* See Section 3 for detailed information on financing sources

TABLE 3

ACTIVITY CATEGORIES FOR VOLUNTARY COMPLIANCE PERIOD

1) COMMUNITY EDUCATION

Cable/educational channels
Workshops/neighborhood meetings
Newspapers
Radio
Volunteerism
Billboards/road signs
Events/fairs
Fact sheets
Public speakers

2) SCHOOL INVOLVEMENT

Logo contests
Curriculum

3) BUSINESS/EMPLOYEE INVOLVEMENT

Champion fitness center information dissemination
Noranda employment package
Statement mailings
Small business development

4) GOVERNMENT PROGRAMS/LEADERSHIP

Air quality specialist position
Information bank
Phone advisory calls
Events (wood stove fairs, public speakers, exhibit booth)
Hotline (Provide educational information as well as air quality information)
Examples set by officials and county employees
Moisture meters

5) HEALTH/MEDICAL INVOLVEMENT

Health brochures in medical offices
Health symposium

TABLE 4

ACTIVITIES TO IMPLEMENT THE PROGRAM

1) LINCOLN COUNTY

Explore long-term possibilities of natural gas as a heating source
Implement tax credit for weatherization and conversion activities
Explore bulk sale distributions of pellets or fire logs
Establish a private, nonprofit Clean Air Fund

2) AIR QUALITY SPECIALIST

Conduct energy consultations and give weatherization advice
Conduct wood moisture testing
Advise homeowners on type and size of replacement wood stoves
Inspect for proper installation of new wood stoves

3) LENDING INSTITUTIONS

Offer Clean Air Loans

4) LOCAL RETAILERS

Offer sales incentives for fire logs
Offer discounts to senior citizens for fire logs
Sell low-cost wood shed kit for wood storage
Offer cost incentives or bulk sale discounts

5) MANUFACTURERS OF HEATING DEVICES

Offer incentives for purchases of new wood stoves (in conjunction with WHA)
Offer incentives for purchases of propane furnaces and stoves
Offer incentives for purchases of oil furnaces and stoves

6) PACIFIC POWER AND LIGHT

Promote low-interest conversion loan program
Promote zero percent interest weatherization program
Encourage suppliers to offer promotions

7) COMMUNITY GROUPS

Develop distribution and delivery program for fire logs
Make low-cost wood sheds to sell to homeowners

8) HOMEOWNERS

Weatherize - Weather strip, caulk, install energy efficient doors and windows, insulate (performed by homeowner or contractor)
Adopt good wood burning habits
Have wood moisture tested

TABLE 4 - Continued

ACTIVITIES TO IMPLEMENT THE PROGRAM

9) LOCAL EMPLOYERS

Offer financial incentives to employees for weatherization or conversion activities
Purchase fire logs in bulk and sell to employees at a discount price

10) ECONOMIC DEVELOPMENT COUNCIL

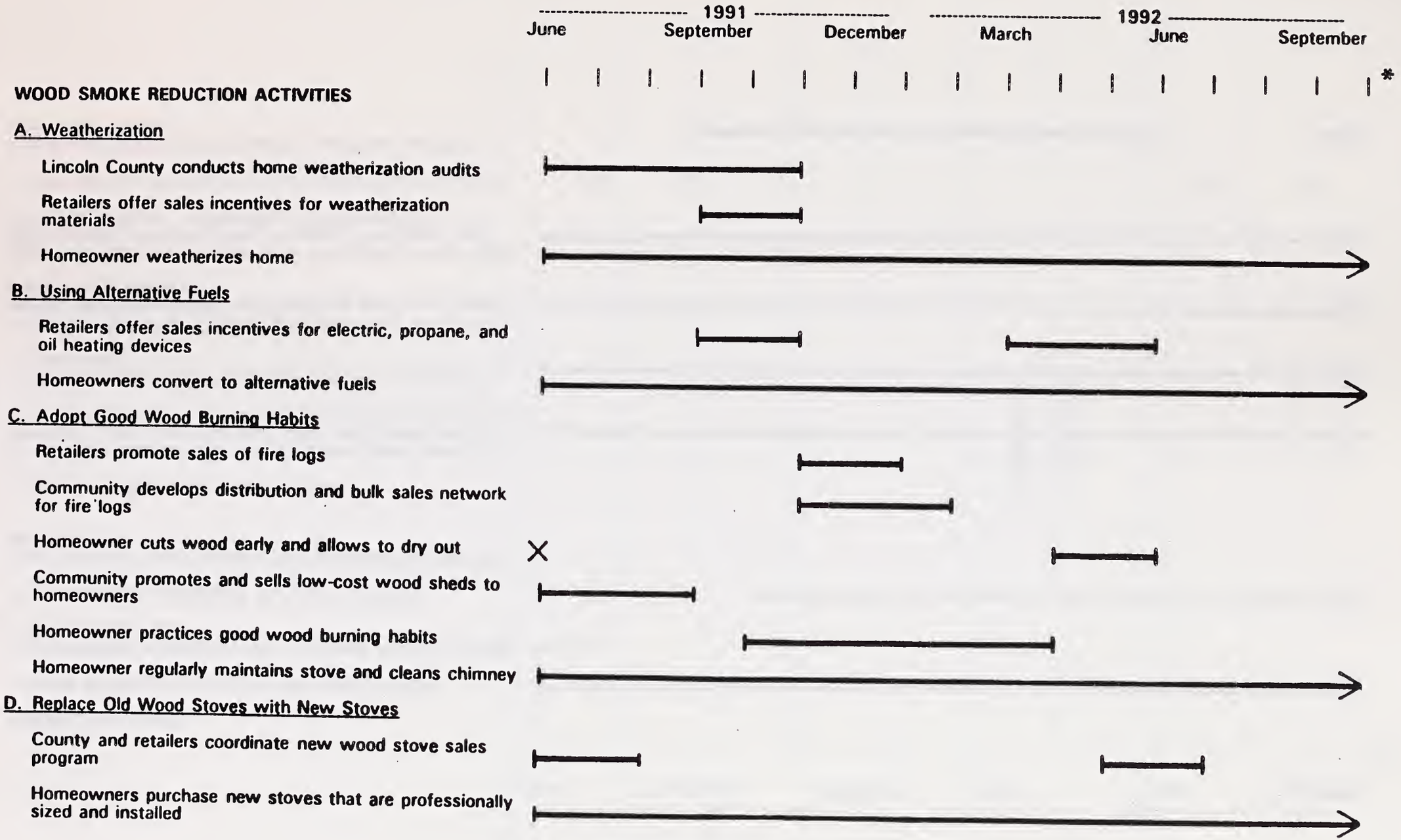
Explore possibility of local production of fire logs

11) LIBBY JOB SERVICE

Explore possibility of using job training funds for air quality specialist position and other newly created positions such as chimney sweeps, wood stove installers, weatherization contractors, electricians, and fire log distributors.

TABLE 5

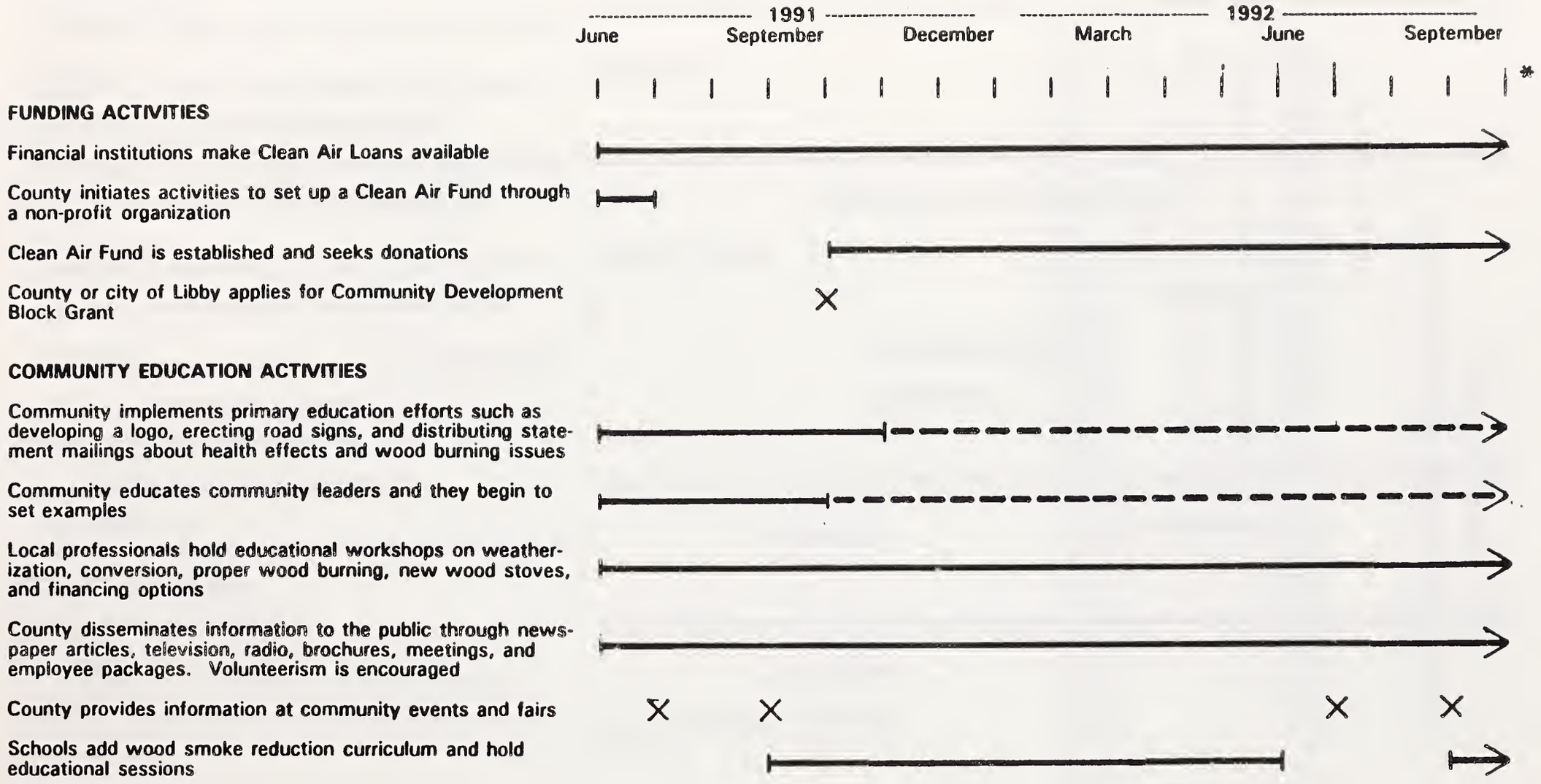
LIBBY WOOD SMOKE REDUCTION PLAN
TIMETABLE FOR IMPLEMENTATION


1991
1992
June
September
December
March
June
September
*
WOOD SMOKE REDUCTION ACTIVITIES
A. Weatherization
Lincoln County conducts home weatherization audits
Retailers offer sales incentives for weatherization materials
Homeowner weatherizes home
B. Using Alternative Fuels
Retailers offer sales incentives for electric, propane, and oil heating devices
Homeowners convert to alternative fuels
C. Adopt Good Wood Burning Habits
Retailers promote sales of fire logs
Community develops distribution and bulk sales network for fire logs
Homeowner cuts wood early and allows to dry out
Community promotes and sells low-cost wood sheds to homeowners
Homeowner practices good wood burning habits
Homeowner regularly maintains stove and cleans chimney
D. Replace Old Wood Stoves with New Stoves
County and retailers coordinate new wood stove sales program
Homeowners purchase new stoves that are professionally sized and installed

* OCTOBER 1992 - REGULATORY DEADLINE FOR ACHIEVING 60 PERCENT PM10 REDUCTION GOAL

TABLE 5 - Continued

LIBBY WOOD SMOKE REDUCTION PLAN
TIMETABLE FOR IMPLEMENTATION


1991
1992
June
September
December
March
June
September
*
FUNDING ACTIVITIES
Financial institutions make Clean Air Loans available
County initiates activities to set up a Clean Air Fund through a non-profit organization
Clean Air Fund is established and seeks donations
County or city of Libby applies for Community Development Block Grant
COMMUNITY EDUCATION ACTIVITIES
Community implements primary education efforts such as developing a logo, erecting road signs, and distributing statement mailings about health effects and wood burning issues
Community educates community leaders and they begin to set examples
Local professionals hold educational workshops on weatherization, conversion, proper wood burning, new wood stoves, and financing options
County disseminates information to the public through newspaper articles, television, radio, brochures, meetings, and employee packages. Volunteerism is encouraged
County provides information at community events and fairs
Schools add wood smoke reduction curriculum and hold educational sessions

* OCTOBER 1992 - REGULATORY DEADLINE FOR ACHIEVING 60 PERCENT PM10 REDUCTION GOAL

APPENDIX A

REFERENCES

APPENDIX A

REFERENCES

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Kootenai Valley Eagle, "Champion Announces Temporary Shutdown." KVE, February 15, 1991, Libby, Montana.

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U.S. Environmental Protection Agency, Guidance Document for Residential Wood Combustion Emission Control Measures, (EPA-450/2-89-015), September 1989.

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APPENDIX B

EPA FACT SHEET ON HEALTH EFFECTS FROM RESIDENTIAL WOOD COMBUSTION EMISSIONS

POTENTIAL HEALTH EFFECTS ASSOCIATED WITH WOODSMOKE

NATURE OF THE EXPOSURE

* Wood heaters emit several air pollutants, including particulate matter, carbon monoxide, hydrocarbons, and polycyclic organic matter (POM). Particulate matter dominates these emissions.

* "Woodsmoke" consists almost entirely of small, respirable particles (<10 micrometers (um)), 80% are less than 2.5 um. Thus, woodsmoke can affect all areas of the respiratory tract and readily reach the deep lung (alveolar region). Retention of particles in the deep lung can be quite long, with clearance times of months to years.

* The chemical composition of woodsmoke is diverse and contains a number of toxic, irritant, and carcinogenic compounds.

* In some areas respirable particles from woodsmoke can easily exceed all other forms of ambient air pollution, and on occasion, health-based ambient air quality standards have been exceeded several fold. In addition, residential wood combustion can be a major source of POM emissions, a class of compounds containing carcinogens.

* Woodsmoke generally accumulates near where it is emitted, directly impacting area residents.

HEALTH EFFECTS

Overview

* Health concerns of woodsmoke are associated both with short-term and long-term exposures, particularly where air pollution standards for particulate matter are exceeded.

* Studies examining the effects of particulate air pollution on human populations (epidemiological studies) provide the bulk of the health effects information relevant to woodsmoke. Based on characteristics of particle size and chemical composition, there is no reason to believe that woodsmoke is less toxic or damaging than the general particulate matter measures obtained in these studies; in some instances woodsmoke may be of greater concern and the available health evidence summarized below may not fully characterize health risks associated with woodsmoke.

* Healthy adults may not notice outward effects at high levels other than simple eye, nose, or throat irritation.

* The major groups that should be concerned about more serious respiratory and other responses are people with existing respiratory and cardiovascular disease (for example,

asthma, bronchitis, heart disease), the elderly and children. These individuals may experience a variety of overt symptoms such as cough, wheeze, shortness of breath, and chest pain, with increased difficulty associated with everyday activities involving physical exertion. At times symptoms may not be noticeable until several days after pollution episodes.

* Children may be at risk as they breathe woodsmoke deep into their lungs for extended periods while exercising at play.

* Studies have established that exposure to POM-containing mixtures is associated with an excess incidence of lung cancer in humans. Exposure to POM in woodsmoke may therefore pose some cancer risk.

Short-term Exposures

* Clear evidence from epidemiological studies implicates particulate pollution in aggravating disease among bronchitics, asthmatics, cardiovascular patients, and people with influenza (U.S. Environmental Protection Agency, 1982, 1986).

* Specifically, particulate matter pollution may:
  - Increase mucus loading or otherwise affect the airways of bronchitics, aggravating their debility.
  - Cause bronchoconstriction (a common response to respiratory irritants) in a variety of individuals (e.g., asthmatics, bronchitics) or even asthma "attacks" in some instances. Associated depression in lung function may be incapacitating or even life threatening for severely ill or sensitive patients.
  - Affect oxygen uptake in the alveolar region; this is particularly important for patients with severely compromised lung capacity (e.g., emphysema).

* Laboratory studies indicate that mucociliary clearance (the ability of the respiratory tract to clear foreign particles, bacteria, etc.) or other lung defense mechanisms may be altered. Several community epidemiological studies suggest increased respiratory infection during pollution episodes.

* Particulate pollution episodes are associated with reduced lung function in children, these changes may persist for up to two weeks after the exposure (Dockery et al., 1982).

* Studies conducted in areas with high particulate pollution, comparable to levels occasionally reported in areas heavily impacted by woodsmoke (i.e., 4-5 times the ambient standard), report increases in mortality in the elderly and other sensitive populations (see U.S. Environmental Protection Agency, 1982, 1986).

Long-term Exposures

* The effects of chronic exposure to air pollution can be quite difficult to discern without fairly involved epidemiologic techniques. For particulate pollution, a number of community epidemiological studies indicate higher prevalance of respiratory symptoms such as wheeze and cough, increased respiratory illness and disease, or lower lung

function for populations living in areas of high pollution. In particular, children in such areas may show increasd rates of illness (e.g., Ware et al., 1986), which might have longer-term consequences.

- Long-term exposure to particles has produced lung tissue damage in laboratory animals.

- The presence of carcinogenic compounds in woodsmoke, and potential interaction with other pollutants and cigarette smoke, raises some concern about possible lung cancer in exposed populations.

REFERENCES

Dockery, D. W., et al. (1982) Changes in pulmonary function associated with air pollution episodes. J. Air Pollut. Control Assoc. 32: 937-942.

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U. S. Environmental Protection Agency. (1986) Second addendum to air quality criteria for particulate matter and sulfur oxides (1982): assessment of newly available health effects information. Research Triangle Park, NC: Office of Health and Environmental Assessment, Environmental Criteria and Assessment Office; EPA report no. EPA 600/8-86/020F.

Ware, J.H., et al. (1986) Effects of ambient sulfur oxides and suspended particles on respiratory health of preadolescent children. Am Rev. Respir. Dis. 133:834-842.

APPENDIX C

PRC AIR QUALITY QUESTIONNAIRE

LIBBY QUESTIONNAIRE ON WOODSMOKE

1) Do you use a woodstove or fireplace to heat your home? Yes ___ No ___ Both ___
If yes, which do you use as a primary heat source?

2) Are most people aware that there is an air quality problem in the Libby area?

3) Is wood burning responsible for much of the air pollution in Libby? How much? Do community members feel wood burning is responsible?

4) Do you feel that people in the community that use wood collection/woodstove burning as their primary heating method are satisfied with this method? Are you satisfied with this method?

5) If so, what advantages do you feel this method offers (for instance, low cost)? What advantages do community members feel this method offers?

6) How would you feel about being required to convert to a more efficient stove, upgrading your current stove, changing heating habits, or using another energy source (such as pellets, gas, or propane)? How would community members feel about being required to convert?

7) If wood smoke controls became law, what changes would you be most willing to make at your home to reduce emissions?

   a) Cutting wood 6 months to a year early so it dries thoroughly

   b) Covering your wood

c) Changing burning and stoking habits

d) Insulating and weatherizing your home

e) Changing to another fuel, such as gas or pellets

f) Cleaning your chimney regularly

g) Burning only wood (no paper)

h) Performing routine maintenance on your stove

8) Do you think that individual households are aware they may need to make a financial contribution toward a solution to the wood smoke problem?

9) What methods do you feel would be best for educating Libby residents about efficient wood burning, upgrading stoves, and stove improvement financing (for example, newspaper ads and workshops)

10) What are the best locations for public meetings and workshops?

11) Any other thoughts?

Please forward to:

Ron Anderson
County Sanitarian
418 Mineral
Libby, MT 59923
(406) 293-7781

APPENDIX D

LIBBY RESIDENTIAL WOOD SMOKE REDUCTION PLAN
RESIDENT COST WORK SHEET

APPENDIX D

LIBBY RESIDENTIAL WOOD SMOKE REDUCTION PLAN
RESIDENT COST WORKSHEET

Strategies	One-Time Cost	Annual Cost
A. WEATHERIZE		
Energy audit	MINIMAL	
Caulking and weather stripping materials ($10 to $50)	_____	
Storm windows and doors ($130 to $250 per window, $250 to $800 per door)	_____	
Insulation ($0.50 per square foot)	_____	
B. USE ALTERNATIVE FUELS		
Electricity		
Cost of system	_____	
Fuel cost ($_____/kilowatt X annual kilowatt usage)		_____
Propane		
Cost of system	_____	
Fuel cost ($_____/gallon) X annual gallon usage)		_____
Oil		
Cost of system	_____	
Fuel cost ($_____/gallon) X annual gallon usage)		_____
C. ADOPT GOOD WOOD BURNING HABITS		
Burn fire logs	_____	
Burn dry wood	FREE	
Burn a hot fire	FREE	
Institute a stove maintenance program		
Chimney cleaning		_____
Catalyst replacement	_____	
Bypass damper	_____	
Gaskets		_____
Burn the right type of wood	FREE	
D. REPLACE OLD WOOD STOVE WITH NEW STOVE		
New stove	_____	
Installation and chimney modification		_____
TOTAL COST	_____	_____

NOTE: Appropriate professionals should be consulted when estimating costs for alternative heating systems and new wood stoves.

APPENDIX D - Continued

LIBBY RESIDENTIAL WOOD SMOKE REDUCTION PLAN
RESIDENT COST WORKSHEET

Existing Sources of Financing	Total Amount	Monthly Payment
PP&L Zero Interest Weatherization Loan Program	_____	_____
PP&L Loan Program for Heating Conversions	_____	_____
Low Income Energy Assistance Weatherization Program	_____	
Low Income Energy Assistance Program Benefits	_____	
Clean Air Loan Program	_____	_____
State Tax Credit for Qualifying New Wood Stoves (an offset to cost)	_____	_____
Homeowner	_____	_____
Proposed Sources of Financing		
Clean Air Fund	_____	
Community Development Block Grant		_____
TOTAL FINANCING	_____	_____

APPENDIX E

POTENTIAL SOURCES FOR FUNDS FOR A PRIVATE NONPROFIT CLEAN AIR FUND

APPENDIX E

POTENTIAL SOURCES FOR FUNDS FOR A PRIVATE NONPROFIT CLEAN AIR FUND

PRC conducted research, including a database search, to identify donors that may be appropriate for a nonprofit Clean Air Fund established in Libby. The selection of each donor was predicated on the criteria listed in Section 6 for national foundations, corporations, and corporate foundations funding projects in Montana, and/or national efforts that closely meet this criteria.

PRC can assist Lincoln County with future activities such as:

- Developing a prospectus for funding for making funding requests
- Developing an actual marketing plan including a fund raising goal
- Providing grass root training in fund raising
- Designing approaches to donors and appropriate follow-up for completion of the campaign.

The following is a listing of potential donors, including contact persons and addresses:

- Montana Community Foundation. Figures indicate that a total of $3.7 million was given to the following regions of Montana in 1988:
  - Big Sky
  - Bitteroot
  - C.M. Russell
  - Glacier
  - Gold
  - Greater Yellowstone
  - Mountain Region

NOTE: Community foundations receive all types of funds and act as clearinghouse and distribution centers thereby eliminating the need for private donors to administer funds, research projects, and maintain an ongoing pool of funds. These community foundations are becoming so popular as a solution to the disbursement of funding that the Lilly Endowment began a $47 million program to help build at least 20 more such foundations nationwide.

- Anschutz Foundation. Anschutz is a Denver-based property and railroad concern with holdings in Montana (Range of gift: $5,000 to $10,000).

  David Geis or Sue Anschutz Rodgers
  2400 Anaconda Tower
  555 17th Street
  Denver, Colorado 80202

- Otto Bremmer Foundation. This foundation offers broad purpose grants in Montana, Dakotas, and Minnesota, and is interested in health issues, community issues ($15,000 range).

  Joseph C. Imberman
  368 North Wabasha, Suite 1300
  St. Paul, Minnesota 55102

- Burlington Northern Foundation. Burlington Northern provides grants devoted exclusively to health and welfare causes ($20,000 to $30,000 range).

  John C. Ashton, Executive Director
  176 East 5th Street
  St. Paul, Minnesota 55101

- The Bush Foundation. It is interested in the delivery of health care and preventive health issues and offers Bush Fellowships and Internships ($20,000 range).

  Humphrey Doermann
  Executive Director
  W-962 First National Bank Building
  St. Paul, Minnesota 55101

- Champion International Foundation. Champion International manages timberlands and manufactures paper products. It is "firmly committed to participating positively in the society at large."

  Leslie Forrest, One Champion Plaza
  Stamford, Connecticut 06921

- Cinnabar Foundation. Cinnabar funds specific self determination issues in Montana ($10,000 and under range).

  Family Foundation in Montana
  Private residence (not listed) in Billings

- Claiborne Foundation (Liz). Claiborne is interested in Montana projects including general health and social services ($15,000 to $45,000 range).

  Melody Lyons
  119 West 40th Street - 4th Floor
  New York, New York 10018

- Fortin Foundation of Montana. Fortin provides grants for broad purposes and health issues and is exclusively Montana directed ($10,000 to $25,000 range).

  Phillip N. Fortin, President
  P.O. Box 1555
  Billings, Montana 59103

- Georgia Pacific Foundation. Georgia Pacific has a strong emphasis in funding health and education programs in the Northwest. Proposals are accepted year round ($20,000 to $45,000 range).

  Marion L. Talmadge, V.P. Corporate Affairs
  133 Peachtree Street North East
  Atlanta, Georgia 30303

- Mountain Bell Foundation. Mountain Bell gives to organizations "which enhance the character of the community or preserve a community's heritage."

  Phyllis D. Jennings-Bryd
  The Mountain States Telephone and Telegraph Company
  Mountain Bell Foundation
  1801 California Street, Room 5050
  Denver, Colorado 80202

- Northwest Industries Foundation. Begun in 1985, the NIF has donated $2.1 million to 10 community foundations and other projects in the Northwest with an interest in health.

  Ben W. Heineman, President
  6300 Sears Tower
  Chicago, Illinois 60606

- PacifiCorp. This power and light company gives to conservative, established community programs. Applications are accepted year round.

  John Peterson
  PacifiCorp
  Public Service Building
  920 South West Sixth Avenue
  Portland, Oregon 97204

- Rainier Bancorporation Foundation. Rainier places emphasis on the Northwest and gives to health and education programs.

  Peter A. Galloway
  P.O. Box 3966
  Seattle, Washington 98101

- Weyerhaeuser Company Foundation. Weyerhaeuser provides new grants focusing on projects "with direct and unique relevance to the forest products industry."

  Mary Stewart Hall, V.P. and Executive Director
  Weyerhaeuser Company Foundation
  Tacoma, Washington 998477

NEW FOUNDATIONS AND TRUSTS - MONTANA DIRECTED FUNDING

- AON Foundation. Health, social services, and community funds.

  Wallace J. Buya, V.P.
  123 North Wacker Drive
  Chicago, Illinois 60606

- Florence V. Burden Foundation. Provides funding for health, aging, and social services issues.

  Barbara R. Greenberg, Executive Director
  630 Fifth Avenue, Suite 2900
  New York, New York 10111

- The McGraw-Hill Foundation, Inc. McGraw-Hill provides health and welfare grant assistance.

  Susan A. Wallman
  1221 Avenue of the Americas
  New York, New York 10020

- National Medical Enterprises. National Medical Enterprises emphasizes preventive health programs.

  Dyanne M. Hayes
  P.O. Box 4070
  Santa Monica, California 90404

- Texas Instruments Foundation. Texas Instruments funds health and youth issues.

  Liston M. Rice, Jr., President
  P.O. Box 655474, Mail Section 232
  Dallas, Texas 75265

- Union Pacific Foundation. Union Pacific emphasizes health and social welfare issues.

  Charles N. Olsen, President
  Martin Tower
  Eighth and Eaton Avenues
  Bethlehem, Pennsylvania 18018

- J.C. Penney Company Foundation. J.C. Penney funds health and human welfare issues.

  Robin Caldwell
  P.O. Box 65900
  Dallas, Texas 75265

- Texaco Foundation. Texaco funds enhancements to the quality of life, social welfare, and health issues.

  Maria Mayer
  2000 West Chester Avenue
  White Plains, New York 10650

- Gladys Knowles Charitable Memorial Trust. This trust provides local funding in Montana for preventive health issues (range under $20,000).

  Gladys Knowles Charitable Memorial Trust
  Hardin, Montana

- Ila B. Dousman Fund. Dousman is interested in Montana issue funding (range under $20,000).

  Ila B. Dousman Fund
  Big Fork, Montana

- M.P. Co-Entech Foundation. M.P. Co-Entech is interested in Montana issue funding (range under $20,000).

  M.P. Co-Entech Foundation
  Billings, Montana

- Livingston Community Trust. Livingston is interested in local Montana issue funding (range under $20,000).

  Livingston Community Trust
  Livingston, Montana

- Cordingley Foundation. Cordingley is interested in local Montana issue funding (range under $20,000).

  Cordingley Foundation
  Hardin, Montana

- Peter and Mary Muth Foundation. This foundation is interested in Montana issue funding (range under $20,000).

  Peter and Mary Muth Foundation
  Hardin, Montana

APPENDIX F

PUBLIC COMMENTS

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PUBLIC COMMENTS ON DRAFT RESIDENTIAL WOOD SMOKE REDUCTION PLAN FOR LIBBY, MONTANA

This appendix lists the public comments received on the draft Residential Wood Smoke Reduction Plan and presents responses to these comments. These comments were received during a public meeting held April 24, 1991 at the Asa Wood Gym in Libby. A 2-week public comments period followed the meeting. All comments submitted after the meeting were to be addressed to the Lincoln County Sanitarian. The public comment period ended on May 10, 1991.

The public meeting and comment period were held to ensure that the wood smoke reduction plan met the needs and concerns of Libby residents. Although the plan was developed through extensive community interaction, the receipt of public comments further assured development of a plan useful to the Libby area. Where possible, public comments were incorporated into the final plan.

Each comment noted below is numbered and appears in italics. The responses follow each comment directly.

1. *Fifty percent of people in the community are on welfare. New stoves will raise our taxes. Who will pay for all of this?*

   The plan does not propose paying for new wood stoves from local taxes revenues. Instead, two programs are proposed: (1) an individual loan program for residents (Clean Air Loan Program) and (2) a grant program administered by a nonprofit organization (Clean Air Fund).

2. *Grant money is not free money. It comes from taxpayers.*

   For the most part, that is not the case. The proposed grant program that would be administered by a Clean Air Fund would seek funds from numerous private foundations and to some extent appropriate government funds, such as EPA funds. Appendix E of the plan includes a list of potential funding sources.

3. *I am not bothered by wood smoke. How bad is wood smoke for you?*

Wood smoke can cause decreased lung capacity, increased angina, edema, scarred lungs, and increased cancer risk. Please refer to pages I-4 and I-5 of the plan for more detailed information on documented health effects.

4. *Smoke from the Champion mill is very bad. Why hasn't this been addressed?*

The community's concern about Champion's emissions is understood. However, Champion's emissions are beyond the scope of this plan. The community should be aware that the local and state governments are working with Champion to address emissions from the mill.

5. *Maybe road dust is the health problem.*

The community's concern about road dust is understood. However, road dust pollution is beyond the scope of this plan. The community should be aware that the local and state governments are working to address this problem.

6. *What about smoke from slash burning?*

The community's concern about slashburning is understood. However, slashburning is beyond the scope of this plan. The community should be aware that the local and state governments are working to address this problem.

7. *Would an EPA program be worse than this?*

This concern, though understood and appreciated, is beyond the scope of this plan. Please refer to Chapter I, Section 2 of the plan for a discussion of this program's goals. While EPA has the authority to impose sanctions on the Libby area if no improvement occurs, it may be flexible regarding imposing sanctions if a local program is already in effect and is showing signs of succeeding.

8. *Having bad air in the community leaves a bad legacy for our children.*

This is one of the main reasons why the county is working to improve air quality.

9. *We want to keep the program at a local level. Other places have much stricter rules.*

This comment is appreciated and insightful. Local control provides more choices and flexibility. Voluntary efforts are needed to make the local program a success.

10. *I work with senior citizens on fuel assistance and this assistance may not be available in the future. These senior citizens can't afford an alternate form of heat.*

Regional representatives of the Low Income Energy Assistance Program (LIEAP) were contacted in Kalispell and indicated that they do not believe that the future of the fuel assistance program is in danger, as indicated in recent newspaper articles. According to these representatives, a majority vote of Congress would be required to eliminate the program in any part of the country. They feel it is very unlikely that this would occur, particularly for the Northwest region where, because of cold winter temperatures, the program is most needed.

11. *Slashburning is very heavy around Nordic Fest time. City dwelling is hazardous in general. Maybe people living in the city should get air filters or maybe they should move to the suburbs. Street sweepers actually kick up dust.*

Residential wood smoke is known to contribute a significant portion of the air pollution in Libby. Actions to reduce wood smoke will also reduce fuel consumption and provide many other benefits.

12. *I have a wood shed and cut my wood three years before I burn it. But, my wood shed was assessed for taxes.*

This is a consideration for homeowners before erecting a wood shed. Residents should check with the County Assessors Office about their policy concerning assessment of such structures.

13. *What will the EPA actually do?*

This comment is appreciated, but is beyond the scope of this plan. It is recommended that concerned residents contact EPA to determine its possible intentions.

14. *Who turned Libby in?*

The federal government requires all states to conduct monitoring to determine air quality levels. The state of Montana has conducted monitoring efforts throughout the state for several years. Particulate air pollution levels in Libby repeatedly exceeded the federal standards.

15. *Who will buy my old stove if I replace it with a new one?*

It is recommended that the county develop a program for disposal of old wood stoves. Because older stoves are high polluting, it is not recommended that they be sold for reuse.

16. *Wouldn't a local air quality position be just like a mini-EPA?*

Since Libby's air pollution problems are diverse and require a large amount of time for targeting education and enforcement, it is recommended that a county air quality position be created. A local resident would be under the supervision of officials who are elected locally. As noted above, Libby residents should take the opportunity to implement their own local program. An air quality position would facilitate the local effort.

17. *What was the total cost of the plan?*

The total cost of the plan was $35,400. The plan was developed because it was felt that a customized plan was needed for the Libby area, a plan which took the financial and community concerns of local residents into consideration. Development of the plan involved interviewing several local residents, collecting information and providing residents with a variety of options and opportunities to select the best alternative(s) for their lifestyle. The project was jointly funded by Lincoln county, the State of Montana, and local utility companies.

18. *Creating an air quality position will just mean more taxes for a new employee.*

It is true that an additional employee will require additional funding. However, if a local program is put into effect, it is possible that part of the funding may come from state or federal governments. Lincoln County should be contacted for more details about this issue.

19. *Why not extend the voluntary program?*

If the plan is implemented and the community is making an effort to decrease wood smoke emissions, the county may choose to extend the period of the voluntary program now in place beyond October 1992.

20. *Wet wood isn't bad to burn. They use steam to clean chimneys.*

This statement is inaccurate. Wet wood does not burn completely and produces more particulates than dry wood. Please refer to the Plan for more detailed information.

21. *There is more control with a voluntary program. What would a federal program do?*

A federal program could dictate specific, mandatory control measures.

22. *What guarantee is there that EPA will be satisfied in two years? Are they going to change the rules later on?*

This comment is appreciated, but is beyond the scope of this plan. It is recommended that concerned residents contact EPA to determine its possible intentions.

23. *Will changing out 1,000 wood stoves put us in compliance? How many stoves would we need to replace?*

This is difficult to determine because the pollution emission rate of each stove varies. However, changing out 1,000 wood stoves would significantly reduce the overall pollution emissions in the community.

24. *Your chart says that my stove is inefficient, but it holds a fire all night.*

The chart provides average efficiency for different types of stoves and is intended to serve as a general guide to heating efficiency. The efficiency of older stoves varies greatly. However, even a well-maintained older stove will not burn as efficiently as a new EPA-certified stove.

25. *Burlington Northern runs their train engine all night. What kind of pollution is that causing?*

This comment is appreciated but is beyond the scope of this plan. It should be noted, however, that this concern is an example of the issues that could be addressed by the new county air quality employee.

26. *I have a winterized home with a new oil stove, and was using five gallons of oil a day, which I couldn't afford.*

Each resident should carefully examine the costs of all the options before choosing any strategy such as an alternative fuel. Energy conservation measures such as weatherization should also be maximized. Please refer to the plan for specific information regarding wood heating alternatives and financial strategies.

27. *I'm against a wood burning ban. You have no right to tell me what and when to burn. What does efficiency mean?*

This plan has been developed as a means to avoid any future wood burning ban. A definition of heating efficiency is included in Chapter I, Section 2 of the report.

28. *How many violation days are we talking about?*

Libby has experienced from 6 to 13 violation days per year in recent years.

29. *Most people don't have alternative heat.*

This comment may not be completely accurate. Research indicates that the majority of households use electricity, propane, or oil as a primary or secondary form of heat. This is discussed in Chapter I, Section 4 of the report.

30. *Other forms of fuel, such as oil, have worse fumes than wood smoke. You just can't see them. The government shouldn't tell others what to do.*

The specifics on some other forms of fuel are addressed in Chapter II, Section 1-B of the plan. It should be noted that an analysis of their emissions, if not in the form of PM-10, is beyond the scope of this effort.

31. *The community shouldn't be so negative, they should be positive. Explain the statement in the report: the National Wildlife Federations efforts were halted by the U.S. Forest Service. Also explain the "strong impact the County intends to have."*

The first statement is this comment is appreciated as it is both accurate and insightful. Also, the second comment regarding halting the national Wildlife Federations's efforts has been modified; please see Chapter I, Section 4 of the plan. Regarding the county's strong impact, it is anticipated that through implementation of this plan and organization of educational and financial efforts, the county's impact on reducing wood smoke will be both positive and extensive.

32. *Air quality is affected by other things besides stoves. If we eliminated all other sources, then wood stoves wouldn't have to be regulated.*

Although the elimination of other sources is relevant to the success of Libby's air quality effort, it is outside the scope of this effort, as explained in Chapter I, Section 1 of the report. Additional questions regarding reduction of other sources should be directed to Lincoln County officials.

33. *Oil furnaces also emit pollution.*

New oil furnaces emit very low levels of pollution. In fact, pollution emission rates for new oil furnaces are so low that they are not reported with new furnaces.

34. *I don't think wood smoke is harmful.*

Please refer to Chapter I, Section 2 in the report and comment 3 above.

35. *Has Missoula solved their problem?*

Missoula has made significant progress in reducing the wood smoke contribution to air pollution, largely through local community efforts. Missoula still has to work on reducing all its air pollution emissions to comply with federal standards.

36. *Smoke in Las Vegas is much worse.*

Las Vegas is implementing strict pollution control measures.

37. *Champion isn't as polluting as other mills in other towns.*

This comment is appreciated but is beyond the scope of this plan.

38. *How was it determined what percentage of the area's air pollution is from wood smoke?*

Certain instruments that measure local air pollution are able to "fingerprint" the contributions of different sources of air pollution because of the unique residues that are left on filters in the machines.